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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 2, 1886.

VOLUME LII
Number 1.

Calcination of Concentrates.

The immense copper matte product of Butte, M. T., is derived mainly from the concentrates obtained from the second-class ore. These usually contain about 20 per cent copper, 30 per cent sulphur and ten per cent silica, the balance being principally iron, and they are thoroughly calcined in long furnaces heated by wood, worked by two men on 12-hour shifts.

The calcining furnaces, which have been built under the supervision of E. D. Peters, Jr., are described by him as 64 feet by 16 feet outside, and have four hearths, each 14 feet long by 15 feet wide in the clear. The ore is charged from a hopper upon the hearth furthest from the grate, in quantities of 3600 pounds, and, in spite of the great length of the furnace, it is at a bright red heat in two hours.

Without going further into details, it may be stated that each furnace calcines 11 boxes of ore in 24 hours, reducing the percentage of sulphur from 30 to below 40 per cent, and consumes exactly two cords of pine wood. These results are so favorable that the cost of calcination is reduced to about as low a figure as one could hope to attain with a successful mechanical furnace. Care is taken to prevent the formation of sesquioxide of iron, it being almost infusible, and requiring a good deal of time and fuel before the reaction of the sulphides in charge reduces it to a protoxide and fits it for combining with the silica present. In a blast furnace, of course, the powerful reducing atmosphere accomplishes this result at once, but in the reverberatory smelting, which we are now discussing, the point mentioned is of sufficient importance to be always borne in mind.

The concentrates are discharged through a square hole in the hearth nearest the fire-place into an iron car, and are dumped over a high wall into a paved enclosure convenient to the smelting furnaces.

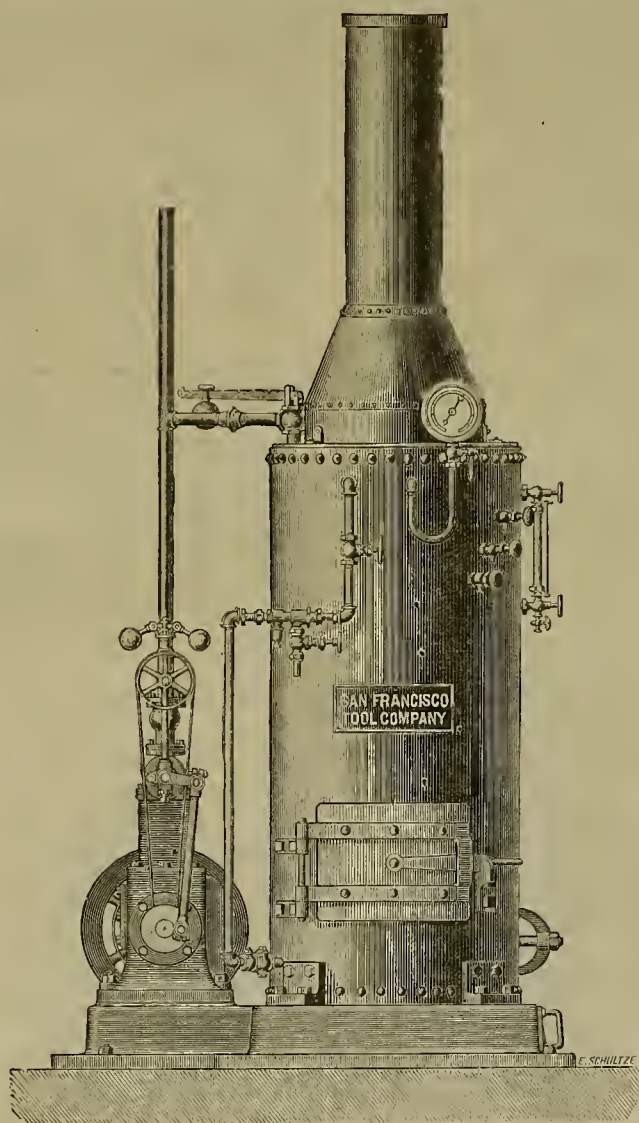
HOPEFUL FOR SILVER.—A dispatch of Tuesday from New York says: A notable change has come over the spirit of the silver opponents here and in other Eastern cities since the actual political and numerical strength of the question in Congress has been accurately defined. The abuse of the so-called silver ring and distortion of facts have yielded to more respectful treatment. The *Mail and Express*, hitherto a rabid goldbug, admits this evening that a change in the method of discussion is advisable. The *Philadelphia Press* this morning has also recognized the fact that the time for conciliation of the majority has come. It joins with the *Chicago Inter-Ocean* in deprecating sectionalism on the silver question. The *Evening Post's* trade and money article says: The silver scare last week disappeared about as quickly as it arose. To-day the nominal rates are \$6.86 for 60 day's sight and \$4.89 for demand bills. The actual market quotations are \$4.85 bid and \$4.85½ asked, and \$4.87½ bid and \$4.88 asked respectively. Business is limited, but nothing at the moment seems to indicate lower prices.

A MINERS' UNION has been organized on the north side of the San Joaquin river. Some of the mine owners are employing Chinese at underground work, and the Union will look after this matter and all the other interests of the miners.

Vanadate of Lead.

An item is going the rounds of the press to the effect that a mine of vanadate of lead has been found, and that the mineral is worth \$10,000 a pound. This lead mineral is properly called Descloizite, and is composed of lead, vanadium and oxygen. The expense of the article is due to its extreme rarity, but even

MINING WORKS DESTROYED.—On Wednesday morning last, very early, three masked men entered the engine room of the Marshall Coal Company's works at Erie, on the Colorado Central Railroad, 40 miles from Denver, captured the engineer, took him several hundred yards away and tied him. They then returned and set fire to all the coal on the dumps. The hoisting-works, engine house, tramway and sev-



UPRIGHT BOILER WITH SINGLE-ACTING ENGINE.

Single Acting Steam Engines.

The engraving on this page shows a form of upright boiler and engine, now being manufactured here by the San Francisco Tool Company. This company is the only maker of these single acting engines on this Coast, and keeps in stock several forms and sizes for different kinds of work. Engines of this class are now extensively employed for all kinds of purposes both in this country and in England, where they have been in regular use for twelve years past. They are in most respects a plain steam engine, without other novelty than having an extra cylinder and piston. They require no oiling, packing or adjusting like common engines, and cost no more according to their power.

The high speed of the engines with centrifugal pumps, dispenses with gearing and belts for pumping, the engine being connected directly to the pump shafts.

The shafts of the engines are made of steel and the connections of bronze. The valves are, in most cases, placed outside the main frame and accessible. The cylinders are jacketed, and every precaution taken to save steam and cost of running. The position of the valves and their working is not concealed and inaccessible, but in sight and adjustable. The wear of the valve and also of its connections can be taken up, otherwise the position would soon be lost.

The crank cases contain nothing but the cranks and piston connections, no governor, eccentric or other parts to break or come loose. The engines have no eccentrics, in the common sense of that term; the valves are driven by cranks. The steam valve is free to wear to its seat, as in the case of a common slide valve, and will not leak from wear.

Piston valve engines are furnished, in some cases, for very high speed and intermittent duty, and where engines are exposed to dust and grit; but are not recommended where oscillating valves will suit as well. Single acting engines will, no doubt, in the near future, take the place of the double acting type in most cases where condensing apparatus is not wanted. They should be examined by everyone desiring to erect steam power. The type shown in the engraving is a very compact one, and serviceable for various kinds of work. Everything about the boiler and engine is complete for work at once when purchased.

A BILL is to be introduced in Congress to lend the name of the Government to an International Exposition which is to be held in Chicago in 1892 to commemorate the four hundredth anniversary of the discovery of America. Chicago people are a good deal interested in this enterprise, and are going to push it with the energy that has made that city famous. The exposition will be planned after that of Philadelphia, and similar legislation is desired, except that no financial aid or guarantee is asked from the Government, the people of Chicago agreeing to foot all the bills.

THE Willamette Steam Mills of Portland, Oregon, have secured a contract for furnishing the lumber for the new bridge across the Missouri river at Omaha. That structure will be of iron and wood, and will cost some \$2,000,000.

then \$10,000 a pound is a high figure, to say the least. A high price ought to be secured from mineral collectors who desire to complete their collections, but any one who expects to get thousands of dollars a pound for it will find it rather difficult to dispose of any quantity. Vanadic oxide is, however, coming into use as a mordant in dyeing, an infinitesimal quantity being sufficient, in conjunction with an aniline dye, to produce a deep and permanent black. The mineral is valuable, but like other rare specimens of the mineral kingdom, only brings such prices as people will pay, and has no standard or fixed value in quantities.

eral cars of the railroad company were completely destroyed. The whole is valued at \$15,000. The destruction of the works throws several hundred men out of employment. Three weeks ago the wages of the men working in these mines were cut down, when a strike was ordered by the labor organization. The miners, rather than be without work at this time of year, refused to obey, and continued at work. The outrage is supposed to be another outcropping of the Rock Springs trouble.

FOUR mines at Leadville, Col., have paid over \$1,000,000 in dividends during the year.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—*Eds.*

Wickes, Montana.

(Written for the Press by our Traveling Correspondent,
R. G. HUSTON.)

Wickes is one of the prosperous mining camps tributary to Helena as a base of supplies, located 22 miles southeast of Helena, and is reached by a branch of the North Pacific railroad, from Prickley Pear junction, which makes one round trip a day from Helena, and accommodates the travel to and from Wickes, as it also does for the local travel to Boulder valley, Elk Horn and other points south of there. There is also a daily stage from Wickes to Butte. On this Wickes branch is the town of Clancy, at the junction of that creek with Prickley Pear, where the old Legal Tender silver mine is situated, one of the oldest as well as one of the richest in this Territory. The vein is very small—from four to ten inches at the largest, and choice ore running up to several thousand ounces silver to the ton. There are several other mines in this locality, but none of them have reached any prominence in mining circles.

The next station is Jefferson, which a short time since was the town of this county; but the reduction works at Wickes and the county seat at Boulder valley have given each town an advantage over their more ancient neighbor. One mile south of Jefferson is Corbin, where the concentrating works for the Alta mine are located. This concentrator is supplied with all the modern appliances for the purpose of extracting the mineral, and is kept running continuously on ore from this mine. They have lately opened out a larger ore body than they have ever had before, and also higher grade. The ore is at present transported from the mine to the mill, one and one-half miles by train, but it is the intention of the company to build another Huson tramway to transfer to the concentrator, from there to the reduction works. The concentrates are taken by rail four miles, and are then first taken to the reverberatory or calcining furnaces, and thence to the blast furnaces, where the bullion is extracted. The product of these two blast furnaces amounting to nearly a car load every day of 24 hours, makes a handsome return for the stockholders once a month, as the past dividends will prove. The Cornet mine, another property of the Helena Mining & Reduction Co., is located on one of the forks of Boulder creek over a divide from Wickes, four miles to the westward. This mine is one of those phenomenal discoveries that miners walk over and around for years before they are found. The miners working on the Rumly lead walked over this mine, and it was only covered by four or five inches of dirt for a long time. Finally a curious party happened to start a prospect hole in the right spot and struck an immense deposit of solid galena ores, and from that time on the Cornet mine has been worked, at first immensely rich and then poor; but now they have a large body of good concentrating ore.

They have a very complete concentrating plant here, and the concentrates are all transported over the mountain by one of the Huson tramways, nearly three miles long, taking the ore up to an altitude of 800 feet from the place of starting, and down the mountain on the other side to a point 1500 feet below the divide. The most of this is done by the weight, the tram being an endless wire cable running over pulleys supported by staunch uprights, and iron buckets fastened to this wire cable every 60 or 70 feet. This is loaded automatically with from 250 to 350 pounds of concentrates or free milling ore, as the case may be. There is a small 12-horse-power engine connected with it to help start it, and that is about all it needs is starting. It is also dumped automatically, and they can easily send 100 tons over in 10 hours' work, at an expense of about \$13. Before putting up this tramway it cost them \$4 per ton—quite a difference in the favor of the stockholders. They intend next season to extend this through to the works at Wickes, as there is no reasonable doubt but that it will work successfully for that distance. On the mine they have just finished very fine hoisting works on their new three-compartment shaft, which will now enable them to get out ore enough to keep everything running to its full capacity. Their hoisting apparatus previously used was too small to accomplish this. The these reduction works were Eastern men, and parties owning these mines and that built many things they did the present company have been compelled to undo; and many of their theories, whilst they were good on paper, would not operate a mine and reduction works successfully. Notably among these were the building of a company chapel, and shutting down the works on Sunday, and compelling all hands to attend service in chapel on Sunday. These are all well enough, but at least the company did not succeed, and, as a matter of fact, with all this gigantic mining plant and two good mines open they lost money—reports say a cool million. The present company have an efficient corps of men in charge, and that it is ably and capably handled is best proved by the fact that every month there is a dividend to be

distributed among the fortunate stockholders of nearly \$20,000.

Besides handling their own mine product the Reduction Co. also work custom ore. They either sample it and buy it out or work it for a stipulated amount per ton.

They have two blast furnaces, eight calcining or reverberatory furnaces, 25 stamps, six Bruckner cylinders, six amalgamating saws and three settlers. The worst feature of the location of their works is their lack of dump for the refuse from the furnaces, although the Railroad Company are helping considerable by taking away many carloads of slag for ballast for their road at different points. They have also six large charcoal furnaces, each of which when charged will turn out nearly 2000 bushels of charcoal, of which they have to use a large amount. There is a large number of other locations in this vicinity. One of these, the Emmet lead, has a shaft down 180 feet. They have an engine to hoist and dump on this mine, and are determined to develop a mine. The Reduction Co. in their two mines and works must give employment to at least 600 men or more. This makes them contribute very largely to the prosperity of this section of the county. The business men of the town seems to be drifting along very comfortably. I am inclined to think that it becomes chronic for the business men of a town to cry dull times. Probably it is from a fear that some impecunious newspaper man will ask them to advertise, subscribe and pay in advance or want them to loan him money enough to get out of town on. I don't know which of these reasons to ascribe it to, but think it is chronic any way.

The Gregory mine is located three miles north of Wickes on a prong of Clancy creek, near the junction, and is a good property. It has been worked for several years, is owned and operated by the same company that own the Glister mine in Lewis and Clarke counties, under the name of Gregory Consolidated. The mill and works have been shut down for a short time for repairs, and they have also been sinking a new shaft and putting in a different hoist. That the mine is a good one is evidenced by the fact that they had just finished shipping nearly 200 tons of bullion. Their bullion is of much higher grade than the Alta and Cornet, containing a much larger percentage of silver. This mine and works give employment to at least 125 men, and many more are at work in the vicinity.

The Canyon Creek District.

(Written for the Press by Our Traveling Correspondent,
R. G. HUSTON.)

This district is located some 35 miles northwest from Helena, Montana, and is reached by the Lincoln Gulch stage running three times a week. The Homestake is on Virginia creek, a tributary of Canyon creek, and is the best developed property in the district—in fact the only one that has a mill. The ore is free-milling gold and silver, and they work it to an average of \$75 per ton. The ledge runs from one to two feet in width, and, of course, is giving its owners full satisfaction. They employ 15 men, and are working in a modest manner and making money. The mine is owned by Mr. Henry Jacob and some Helena parties.

West of this location is the Grubstake. The ore is of the same character, and they have worked quite a large amount of it at the Jacob mill. They are now running a tunnel to strike their lead 100 feet deeper than they have heretofore worked it. What they have worked has paid much the same as that of the Homestake.

East of the Homestake is the Batchelor. The proprietors have run a tunnel and tapped the lead 160 feet from the surface, and find it from 18 inches to three feet wide, and it looks so well that they have refused an offer of \$60,000 for the property, which shows that they have confidence that they have a good mine.

The next east is the Alpha and Omega, whose owners have run a tunnel and tapped the lead at 175 feet from the surface, and have run levels each way 70 or 80 feet. They also crushed some of the surface ore that averaged them \$35 per ton. They have just bonded the property to Sanford & Evans, of Helena, for \$60,000. There is no doubt but it is a good property. There are many other locations in this district, but these are the principal ones that are developed to any extent.

Mineral and Metalliferous Veins.

EDITORS PRESS:—In your issue of Dec. 5th, there appears an article from Mr. Blackburn treating of "mineral and metalliferous veins" in which he argues that fissures are usually caused by "foldings or wrinklins of the earth's crust produced by contraction of its interior." I think it would be difficult for Mr. Blackburn or any one else to explain logically how such effects could be produced by the cause which he alleges. In speaking of how the fissures were filled he says: "Their contents have been deposited from hot alkaline waters, holding the various mineral substances in solution. At Steamboat Springs near Virginia City, there may be observed ocular disproof of the correctness of Mr. Blackburn's speculations. It may there be

seen that at some time subsequent to the drift period there began a flow of hot springs at the summit of the western border of Shallow valley, the waters of which on cooling formed a continuous rocky deposit of considerable length parallel to the direction of the valley. In course of time, as the accumulation extended over the soil toward the lower part of the valley, the weight became so great as to cause the soil on the outer edge to yield and let the rock there sink, so as to produce fissures farther back, by fracture, parallel with the direction of the valley. At this time the roaring of hoiling water may be heard deep down in those fissures, while steam is continually ascending through them to the surface, and being condensed on the sides of the fissures produces a smooth, white, crystalline surface, entirely different in appearance from the matter which the same waters formed by sedimentary deposition. I am persuaded that these springs afford an illustration of the manner in which vertical mineral veins have chiefly been formed, at least in the mode of filling.

JUSTIN CHENOWETH.
San Francisco, Dec. 25, 1885.

Hints for Lubricating.

(Written for the Press.)

There is a most erroneous impression extant in regard to danger of fire from the use of petroleum oils for lubricating, and yet there is not a case on record of fire from the use of petroleum lubricants, or even of fire originating in them while stored. The reason of the impression is that there are numerous accidents from the use of kerosene and coal oil, and as it is known that these oils are obtained from petroleum, everything in the shape of mineral oil has been condemned. The frequent conflagrations in oil refineries, and the fact that numerous oil companies refuse to insure and cannot afford to on account of the high rate demanded, assist to deepen the reluctance with which petroleum oil is regarded.

All the danger of petroleum is in its distillation, a process which comes before and prepares the oil for the latter processes which make it a lubricant. The crude oil when taken from the earth is subjected to heat at various temperatures until its inflammable vapors are all carried off and condensed into the various oils known to commerce as naphtha, benzine, kerosene, etc. After this process has been completed, the remainder of the oil is used and treated for lubricating purposes. It is as harmless as a bee with the sting removed. It can't be set afire unless special effort is made to that end. Blazing sticks can be plunged into it and it will extinguish them like water. Look at the big fire in Brooklyn, N. Y., recently, when a manufactory of lubricating oils caught fire from a neighboring block. The oil, both in complete packages and in unheated barrels was found intact after the flames had been subdued, with the exception of the staves being almost completely burned through.

If any reader will try and set a barrel of cylinder oil on fire he will see how difficult a job he has undertaken. On the other hand, upon taneous combustion, or what is generally understood to be that, has occurred again and again from the use of lard, cotton-seed, castor and olive oils.

CHARLES J. WOODBURY.

123 California St., S. F.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

HORSE COLLAR.—Sylvester B. Davis, Eureka, Humboldt Co., Cal. No. 331,871. Dated Dec. 8, 1885. This improvement in horse collars consists in loosely hinging or suspending shoulder-pads from the neck-pad by means of hame-irons, so that the pads may have a freedom of movement and adjust themselves to the varying position of the horse's shoulders. It also consists in the manner of attaching the tugs or trace to the pads and a means for adjusting the size of the collar.

CARTRIDGE-PACK.—J. C. Kelton, S. F. No. 331,891. Dated Dec. 5, 1885. This invention relates to a means for rapidly reloading the chambers of revolvers, and it consists of cartridges secured together as to be in line with the chambers of the revolver, into which they can all be instantly inserted and the holding device removed. This pack affords a means by which the chamber of the Smith & Wesson and similar constructed pistols can be loaded simultaneously. Six chambers of the revolver may be loaded with this device, General Shelton says, in four seconds. The need of such a pack for certain and rapid loading is absolutely necessary in war, and especially where the pistol is used in hand-to-hand combat, where success depends upon the rapidity with which the pistol can be reloaded and discharged.

TWO-WHEELED VEHICLE.—John A. Gallagher, Stockton. No. 331,957. Dated Dec. 8, 1885. This improvement in "carts" consists in an extensible pivoted connection between the loosely-hung, swinging or pivoted body and the axle, by which the body is prevented from moving backward or forward, while the springs

are allowed to have their own proper spring action, and also the tetering motion received from the shafts without transmitting said motion to the body. The object is to overcome the unpleasant motion of a cart, due to the "joggling" of the horse. This invention contemplates such a connection between the loosely-suspended or pivoted body or axle, by which, while the springs are given their freedom of motion, the body is prevented from moving back and forth with them, while it moves up and down with the spring action.

ROTARY CUTTER FOR DREDGERS.—John H. Bolles, assignee of one-third to John S. Williams, San Francisco. The invention relates to certain new and useful improvements in rotary cutters for dredging machines, in which an outer drum, carrying the hockets, rotates on an inner drum, provided with a reservoir communicating with the suction pipe and the buckets; and the invention consists of a peculiar and novel construction and arrangement of the buckets and in a rotary adjustment of the inner drum. This cutter is specially adapted for use on the dredger invented by Mr. Williams, and described in another paragraph under this heading.

FEED-WATER PURIFIER.—A. J. Stevens, Sacramento, No. 331,917. Dated, Dec. 8, 1885. This feed water purifier for steam boilers consists of an inner shell into which water is admitted, and within which it is heated so as to rise to the top, where it passes through perforations into an exterior inclosing-shell, between which and the inner one it descends, passing through holes in the bottom of the annular space into the boiler. A perforated blow-off pipe extends along the bottom of the inner chamber and through this the deposited sediment may be discharged from time to time by means of a suitable cock. Mr. Stevens, the accomplished master mechanic of the C. P. R. R., who is the inventor of the device, has adapted it particularly for the use of locomotives.

DREDGE.—J. N. S. Williams, assignor of two-thirds to John H. Bolles. S. F. No. 331,929. Dated Dec. 8, 1885. The invention relates to the class of dredging machines of that type known as suction dredgers, in which the material is disintegrated by suitable machinery, and the spoil, together with quantities of water, is carried up through a centrifugal pump and deposited at varying distances, as may be required. The invention consists, in connection with a rotary cutter of suitable form adapted to be adjusted through arcs in horizontal and vertical planes of a suction pipe from the cutter, having a ball-and-socket pipe and a telescopic joint, whereby said pipe may move radially and axially, conforming to the adjustment of the cutter, and a peculiar system of gearing by which the power is transmitted from the engine to the lay-shaft driving the cutter, the gears of said system being adapted to maintain their work throughout all the adjustments of the cutter. The invention consists further, in a novel arrangement and method of using a system of spuds, by which the boat or scow is held.

CHECK-REIN ATTACHMENT.—John C. Kelton, S. F. No. 331,892. Dated Dec. 8, 1885. This check-rein is especially useful for cavalry horses to enable cavalrymen to use both hands in mounted firing while the horses are in motion, and for hard-mouthed or restless horses in general. It consists of an india-rubber tube containing a spring introduced on each branch of the curb-rein, and contracting with a strength sufficient for the purpose. When used for cavalry horses, each trooper, knowing the amount of pressure his horse should have at a gallop, limits his stride to that gait by drawing back the rein-upon starting and fixing the curb at the proper point, and fastening it over the pommel of the saddle, thus effecting the control needed. It then only remains for the trooper with another rein to guide his horse, having both hands free to handle his carbine while firing and loading. By this means the perfect alignment of a cavalry force may be maintained in a charge, when perfect array is absolutely essential for success. The play of the spring affords the horse such movement of his head as not to hamper in going over uneven ground, in jumping, or in case he stumbles and falls. Horses hard to control, or harness, or in mounting under the saddle, when the pressure on the bite is apt to be relaxed, can with this rein be brought to subjection.

EXPRESS MONEY ORDERS.—Wells, Fargo & Co.'s Express have opened a money order department, which it claims reaches a greater number of places than any other west of the Mississippi and Missouri rivers. It requires no application blank; is payable to "bearer" or to "order" as desired, and can be cashed at banks. In case an order should be lost the money will be refunded. Five cents is the charge for \$1 to \$5; eight cents is the charge over \$5 to \$10. These orders are sold throughout the States and Territories west of the Mississippi and Missouri rivers. At hundreds of these places there is neither money order post-office or bank.

ACCORDING to the San Jacinto Register, in a large canyon on the east side of San Jacinto mountain, numerous fan palms have been found, many of which are 50 to 80 feet in height. The trees are also said to be loaded with fruit, which the Indians in that locality subsist upon.

MECHANICAL PROGRESS.

A New Method of Producing Solid Steel.

The Société des Acieries de Longwy, at Longwy, France, has brought forward a new method for the manufacture of solid steel castings which is to be based upon the observations made during the past few years on the causes of blow-holes and the examination of the composition of the masses in them. These masses, it is now well known, consist of carbonic oxide, hydrogen and nitrogen. The hydrogen is increased by the blowing in of air containing moisture and the decomposition of the latter, the nitrogen simply by contact of the air blown through. The fact that hydrogen remains intact in so strongly oxidizing a current of air can only be explained by the circumstance that the intensity of the decomposition of water is increased by the high temperature. It is certain, however, that hydrogen and nitrogen are expelled when they are brought into contact with dissolved oxide of iron instead of with free oxygen. Until now the presence of oxide dissolved has been considered injurious to the working of steel. Difficult experiments have led to the conclusion that both Bessemer pig and Thomas pig, when tapped from the furnace, hold in solution at the same temperature closely equal quantities of gases of nearly identical composition. In casting steel after it has been decarbonized, but before it has been either recarbonized or overblown to remove phosphorus, gas escapes during cooling. After recarbonizing the metal in the acid Bessemer process, it is observed that a mixture of gases escape which is substantially identical in composition with that coming from the pig-iron originally used in the operation. On an average, it is composed of 40 per cent of carbonic acid, 50 per cent of hydrogen, and 10 per cent of nitrogen. This points to the fact that if the blowing led to an increase in the relative quantity of hydrogen and nitrogen in the metal, then the carbonic oxide generated by the reaction between dissolved oxide of iron and the recarbonizer sufficed to restore the same proportion of the gases in the mixture.

The case is quite different with steel produced by the basic process. In this case there is in the bath of metal a very large quantity of dissolved oxide of iron, formed during the after-blow for the elimination of phosphorus. When the recarbonizer is added the mass is strongly agitated by the escape of carbonic oxide. This mechanical action aids the reaction between the oxide of iron and the hydrogen. Therefore, relatively, the quantities of hydrogen and nitrogen in the cooling ingots of basic steel are much less than those produced by the acid process, the percentage of carbonic oxide in the escaping gas being greater. Averages of analyses show that the gas escaping during the casting of basic steel was composed of 80 per cent of carbonic oxide, 10 per cent of hydrogen and 10 per cent of nitrogen, while the gas escaping during the chilling of the ingot contained 60 per cent of carbonic oxide, 30 per cent of hydrogen and 10 per cent of nitrogen.

If it be conceded that blowholes are due principally to the bubbles of hydrogen and nitrogen caught in chilling in the act of escaping, and secondly, by carbonic oxide bubbles under similar circumstances, then the means are provided for making solid castings. If a lively generation of carbonic oxide has the result of mechanically removing occluded hydrogen and nitrogen as F. G. C. Mueller held as one of the results of his investigations—then the generation of that carbonic oxide is desirable. This is obtained by overblowing the metal, thus bringing it into oxide of iron, which, when coming into contact with the recarbonizer, generates carbonic acid. The Longwy method therefore calls for overblowing both in the acid and in the basic converter. The overblown steel is run into an open-hearth furnace. In the latter the chemical action between the oxide of iron and the occluded hydrogen is depended upon to bring about the elimination of the latter.

It appears that the Longwy metallurgists appear to hold the view that hydrogen and nitrogen have entered into some sort of compound with the iron, which is decomposed through the action of the oxide of iron. It is somewhat difficult to share that view, which seems to rest on a very flimsy foundation, chemically. They add also a very siliceous slag as a protection against the gases and as means of decomposing the oxide of iron. Then they add the recarbonizer, pig iron containing silicon and carbon. The generation of carbonic oxide is looked to complete the elimination of the hydrogen and nitrogen, and then, when the bath has quieted down completely, spiegel-eisen or ferromanganese is added in order to get into the metal the needed quantity of manganese to facilitate the rolling of the product. We incline to the view expressed by Mueller that the removal of hydrogen is best accomplished by a violent foal reaction through the addition of a recarbonizer to the overblown metal, and it is probably wisest to use a metal as recarbonizer which is low in silicon. The only use which casting into an open-hearth furnace could be looked upon to have would be the keeping of the bath in so fluid a condition for so long a time that there would be no danger of entangling escaping bubbles of carbonic oxide gas in it—that is, until a dead melt

had been reached. The Longwy people claim that by their process they can cast even the smallest ingots solid.

INVENTIONS BY EMPLOYEES.—It is universally admitted that the people of the United States are *par excellence* a nation of inventions. The *London Globe* says of the "American": "His natural ingenuity, fighting against the artificial enhancement of prices, has driven him to seek relief in mechanical assistance. . . . Every workman in a manufacturing coater is stimulated to study and master the machine under his charge with a view to improving it. Mechanical invention is part of the character of the nation, etc."

Our English contemporary is correct, and it would be highly interesting could a history be written of the successful inventions which have been introduced by workmen while engaged in the regular course of their employment. It would be a history replete with stirring incidents, and enlivened with tales of poor men suddenly lifted to riches and influence, of revolutions in industrial methods, and of changes which often border on the domains of the marvelous. The factory is indeed a school, and from it have graduated many of the brightest and most useful geniuses of the age.

BRITTLE BOILER PLATES.—Boiler plates, after considerable use, says the *Age of Steel*, are frequently found to be almost as brittle as cast iron; in fact, many are in that condition before being used; but when this condition is brought about by use, it is perhaps owing to its absorbing sulphur from the coal; and possibly the common grades combine with sulphur more readily than good iron (when some of this iron is tested by breaking it looks as if it needed sulphur or something to fill up the chinks). It is notorious that sheet-iron chimneys used about mines and other places where sulphury coal or slack is used, are even up and destroyed in next to no time at all, and as a matter of course the boilers get their share of it. I have seen boilers channeled along the seams where there are no leaks, and where it could only have been caused by sulphur or some other product of combustion. As long as only channeling occurs, the danger is not great if the engineer is watchful, but when the sheet becomes brittle also unequal strains produce cracks, and when the crack is once started and pressure enough to open it, the enormously increasing volume of steam, due to the suddenly relieved pressure, is sufficient to do the rest, and the explosion is complete.

GENESIS OF THE CUT NAIL.—Now that cut nails, made of iron, are finding their market disputed by cut nails made of steel, with probability that this tendency will steadily increase as steel nails and their merits become better known, it is interesting to look back to the early days when cut nails first began to dispute the market with the hand made variety. Credit for making the first cut nails is claimed as far back as some years prior to 1790, for the firm then known as J. G. Pierson & Bro., doing business on the spot now known as No. 24 Broadway, New York City. The firm consisted of Josiah G. and Jeremiah H. Pierson, respectively grandfather and granduncle of Henry L. Pierson, Jr., now senior member of the iron firm of Pierson & Co., located at 24 West street, New York, which firm only removed from No. 24 Broadway a year or so ago. In the year 1790 J. G. Pierson & Bro. removed their cut nail works to Ramapo, N. Y., just over the Jersey line, where they carried on the business upon a large scale until the year 1830.—*American Machinist*.

PAPER RAILS.—According to the *Organ des Mines*, of Paris, the paper rail is to become a practical reality. That journal states that a company is about to establish large works for making rails from paper near St. Petersburg. The paper is subjected to great pressure, and it is said that the material is extremely durable, and can be produced at one-third the cost of steel rails. A further advantage would be in their lightness, not only on account of the saving of the cost of carriage and laying, but also because they could be made in longer lengths than is the case at the present time, therefore the number of joints will be fewer, and consequently less oscillation to the carriages, and the wear and tear to both permanent way and rolling stock reduced to a minimum. A greater adhesion also would be offered by these rails to the driving-wheels of the engine, and the working expenses reduced accordingly.

FASTENING A BELT.—A correspondent of the *Woodworker* says about fastening a belt: "After quite a good experience with a great many ways of joining, I must say that above all others I prefer lapping and riveting, and I will give my reasons therefor. First, and above all other things, a riveted joint is the cheapest. I don't mean cemented and riveted, but lapped and riveted, taking care to skive nicely, so that the joint will not be clumsy, making the scarf according to the size of the belt. Do not scarf the ends down too thin; if you do the rivets will be likely to tear out. A little practice in this style of fastening a belt will make you do a nice job, and if you once get used to it I will warrant that you will never use any other method. It takes no more time, if as much, as it does to either lace or hook a belt with any device I have ever seen, and I have seen a great many. This style of fastening should be used all over the mill, whether driving belts or not."

SCIENTIFIC PROGRESS.

Electricity Direct from Burning Coal.

We have already made reference to the exhibition of an electric motor shown at the late International Inventors Exhibition at London, where the electricity was obtained and utilized directly from the combustion of coal without the intervention of a steam engine or any other motor. This invention was pronounced a decided step in advance in utilizing electricity, by which, as claimed below, nearly three times the work can be obtained from coal than can be realized from burning it under a steam boiler in the ordinary way of producing electricity. The device was exhibited by Mr. J. A. Kendall, of North Ormsby, Middlesbrough, and as described by the *London Engineer* as follows:

The battery is based upon the well-known phenomenon of hydrogen passing through platinum at a red heat, two platinum plates being used as the poles, one exposed to hydrogen and the other to oxygen. These plates are arranged in the form of concentric tubes closed at one end, and are separated by a fluid medium of fused glass. Hydrogen gas is continuously supplied to the inner platinum tube, while the entire apparatus is maintained at a high temperature by means of a furnace fed with coke or liquid or gaseous fuel. The absorption of hydrogen by the platinum is accompanied by electric generation, and the current is led away by wires connected with the platinum tubes. It is curious, however, that so long as the two platinum tubes are not connected by a metallic circuit, the passage of the hydrogen is slow, but that as soon as the electric circuit is completed, the rate of flow is suddenly increased, and is steadily maintained at the higher amount. In the case of a group of cells or battery, the same gas-furnace may be used to heat the series. The cells are connected for quantity and intensity as in the voltaic battery. The electromotive force of a cell is given by Mr. Kendall as about 0.7 volt. This is, of course, much less than the theoretical electromotive force of a hydrogen and oxygen couple, and the remaining energy evolved by the combination appears to be developed in the form of heat at the surface of the oxygen plate, and serves to keep up the temperature of the apparatus. In the action of the battery, the hydrogen, in passing through the inner tube, is, so to speak, filtered off from any gases with which it may be mixed. The residual combustible gases, if any, when drawn off by the escape-jet, can be utilized as fuel for the furnace. This is a very valuable feature, as it enables the battery to be worked with strong producer gas, consisting mainly of hydrogen and carbonic oxide, and to be arranged in a very compact way, the spare heat left from heating the cells being available for working the producer. Mr. Kendall proposes to employ it for a variety of purposes—for example, the driving of electric launches and so on. With the new generator, all that is required to maintain the working is a supply of fuel and a little water.

The inventor estimates that a ton of coke used in heating the battery, including the hydrogen producer, will give at least three times the electric energy that would be produced by the same quantity of coke used in working a steam engine and dynamo. It is also hoped by the inventor to develop the new process of electric generation for lighting purposes. Houses can in this way be lighted by incandescent lamps by means of coal gas supplied to the premises, and larger centers of illumination could be economically worked by the use of ordinary fuel, such as coal and coke.

A NEGLECTED PLACE FOR RESEARCH.—There is a good opportunity for some one to make a valuable record as a geographical explorer from a hitherto neglected point of departure on the western coast of Africa—say from Monrovia to the Niger, to determine and secure its productive resources. The Government of the United States has dispatched expeditions to the Arctic regions, the Dead Sea, Japan and South America for scientific and commercial purposes. Why not send a party to explore the region above alluded to? A naval officer of high rank, and who has won distinction by his successful efforts to extend American commerce, has already volunteered his services to lead in so important a survey. An appropriation by Congress of \$25,000 should be made in this behalf, to be expended under the direction of the Secretary of the Navy. The people of the United States can claim Liberia alone as their part of Africa. Why not utilize their position there for the advancement of science and our own as well as the world's commerce? Such an expedition would cost but little, and would, in all probability, be of more value to the world than half a dozen Arctic expeditions, in view of what we already know of those regions.

THE VELOCITY OF THE MOON MADE MANIFEST.—We can faintly picture, says Prof. Langley, how it would seem if we were placed at a station in space near the lunar orbit, and could see the moon, a moving world, rush by us with a velocity greater than that of a cannon-ball in its swiftest flight. This feeling may be almost realized, in fact, by witnessing from some high mountain the shadow of the moon as it passes swiftly by during an eclipse. At such a time, its shadow actually

with the same speed of its flight in space. The observer upon some lofty point, from which his vision reaches many miles to the west, can easily discern and follow the approaching shadow, and witnessing the actual velocity of a heavenly body, as it were, brought down to him.

Such a sight may be witnessed during an eclipse of the sun by an observer stationed upon any high eminence on the eastern flank of the Sierras, which may overlook the adjacent plains for say 40 or 50 miles.

An observer, Mr. Forbes, once obtained such a view from the Superga, at Turin. It was an almost cloudless day, when, just as the eclipse came on, he says: "I perceived in the south-west a black shadow, like that of a storm about to break, which obscured the Alps. It was the lunar shadow coming toward us. I confess it was the most terrifying sight I ever saw. As always happens in cases of sudden, silent, unexpected movements, the spectator confounds the real and relative motions. I felt almost giddy for a moment, as though the massive building under me bowed on the side of the coming eclipse." Another witness, who had been looking at some bright clouds just before, says: "The bright cloud I saw distinctly put out like a candle. The rapidity of the shadow and the intensity produced a feeling that something material was sweeping the earth at a speed perfectly frightful. I involuntarily listened for the rushing noise of a mighty wind."

BONES TURNING TO LIVER LIKE TISSUE.—One of the most remarkable causes of death on record recently occurred to a man near Chicago. George Buck, a young man, who, in health, measured five feet eight inches in height, but whose length, after death, was but four feet seven inches, died of a peculiar disease, which called for a post mortem examination. His body, besides being reduced 13 inches in length, was so collapsed and flattened, that the chest bone and spinal column almost touched. "Here," said the physician to a reporter, who was present, "is a cross section of the right femur. There is not a particle of bone in that. What was bone is now blood-red matter that resembles liver in its normal state. In this condition we found every bone in his body. The cranium resembled a football, inasmuch as any portion could be pushed in and then it would resume its shape again. This red matter, which has taken the place of bone structure, I am not yet able to say what it is, but will make a microscopic examination and report to the medical journals. As to the organs of the body, I found the right lung crowded up under the clavicle. The left lung was almost as fast up, and was affected with pleurisy. Otherwise they were normal, though somewhat atrophied. There was congestion of the liver. The spleen and pancreas were about one-half the normal size and lighter in color than usual. The kidneys were slightly enlarged, indurated, and contained bony deposits of calcareous matter."

SIGNS OF TYPHOONS.—The Government astronomer of Hong-kong has published an account of the phenomena which precede typhoons. The first signs are feathery clouds in the sky of the cirrus type, looking like fine tufts of white wool, and which travel from east to north. These appearances are accompanied by a slight rise of the barometer, clear weather, heat and light winds. The barometer then begins to fall; the heat becomes oppressive; there is a swell on the sea, and the sky assumes a threatening appearance. As the storm approaches, these effects become more marked, while the wind gradually increases in force. Near the center of the storm the wind blows with such violence that no canvas can hold against it, and the rain pours down in torrents. Still nearer the center, the sea is lashed into such fury that this is the most dangerous position for ships. Typhoons are most common during September and August, but they are met with all the year round.

SHAPE OF THE EARTH'S ORBIT.—Proctor remarks that a common error is the supposition that the earth moves in an obviously elliptical path, whereas it really appears to travel in a circle. Taking the earth's orbit when its eccentricity was very nearly at its greatest—\$50,000 years ago—the numbers 325 and 324 represent the actual proportion between the greatest and shortest axes of the figure described by our planet's motion around the sun. So that if a circle is drawn with a radius of three and one-fourth inches, it nowhere departs more than the hundredth part of an inch from the ellipse which would represent with perfect accuracy the orbit of the earth \$50,000 years ago, when it was so much more divergent from an exactly circular form than now.

THE BROOKLYN BRIDGE CABLE.—Tests made of the Brooklyn bridge cables show that they are all magnetized. The bottom parts of all pieces of iron show north polarity, and the cables of the bridge are said to be magnetized in the direction of their diameter, the upper surface of the cables throughout their length being of south polarity and lower surface north.

A LUMINOUS TREE.—There is a small tree growing in a gulch near Tascara, Nevada, the foliage of which at certain seasons is said to be so luminous that it can be distinguished a mile away in the darkest night. In its immediate season it emits sufficient light to enable a person to read the finest print. Its luminosity is said to be due to parasites.



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SAN FRANCISCO:

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Passing Events.

As we begin a new volume of the PRESS with this number, it is hoped that all those who have been our readers for the past year will end in their subscriptions for this one, and lend us their assistance also in inducing others to subscribe.

There seems to be considerable of a mining boom now going on in Oregon, and numbers of new mines are being opened. There is a large section of that State which has hardly been prospected, and the men who have ventured in those regions of late have been doing well.

The quartz mining interests of California are in better condition than for years past. From all parts we hear of old mines being reopened and work being vigorously prosecuted on new ones.

Although the PRESS this week is dated the 2d of January, it is not too late to wish our readers a "Happy and Prosperous New Year."

A COLORADO company is putting up sampling works in Butte, where ores may be sampled and sold. These mine owners who are not sufficiently well fixed to treat their own ores will have an opportunity of ascertaining accurately their value, after which they can sell to the highest bidder. It is an enterprise which will undoubtedly be of great benefit to the class of mine owners mentioned.

THE Oro Grands mill at Calico, is keeping a 15-stamp mill at work.

Expenditures on Separate Claims.

A very interesting decision has been made by the Secretary of the Interior on this question of required expenditure on claims which have been located separately, but which are afterward consolidated and owned by one individual or company. The claim in question is a placer, in this State, and the commissioner of the General Land Office declined to recognize the application for a patent because it was not shown or alleged that \$500 had been expended for the development of each separate original location embraced in the application. The company appealed from this decision to the Secretary of the Interior, who reverses the decision and allows the company to proceed with its application upon showing compliance with the law to date of renewal of such proceedings.

The points brought out in this decision are of interest and importance to those who are desirous of patenting placer claims. The claim covers 140 acres. The location was made by the Good Return Mining Company and six individuals, the latter afterward conveying their individual interests to the company. When they applied for patent this application was rejected under the clause of the Department circular to the effect that "If an individual becomes the purchaser and possessor of several separate claims of 20 acres each, or less, he can include all in his application (if not over 160 acres), but upon each of the original claims or locations he or his grantors must have expended \$500 in improvements." They then refused to file the claim.

It appears that the original locations had been made years ago when the laws did not require them to be placed on record, and they had relocated them in order to apply for a patent. The Land Commissioner held, however, that they must show proof of the \$500 expenditure on each separate claim. The owners then denied that the Department circular had any authority, and that the law really required only \$500 on the entire claim embraced in the application.

The provisions of law for expenditure on mining claims, are in Sections 2324 and 2325 of the Revised Statutes. It is not necessary to quote them here at length, but after speaking of the required annual labor, one of the sections says, "but where such claims are held in common, such expenditure may be made on one claim," etc. The last section requires, on application for patent, that proof of \$500 expenditure must be filed.

The Secretary, in his decision says, that the broad question presented by the appeal, is whether or not the expenditure required to be shown by Section 2325, must be like that required by Section 2324, be so great as to amount to the whole specified sum for each location or discovery claim embraced in the application.

The circular instructions assume that such is the law; and to properly decide the point, requires close analysis of the statute as construed by the highest judicial tribunals. As to Section 2324, the case of Jackson vs. Roby, (109, U. S., 440), establishes the doctrine that the annual expenditure to the amount of \$100 to be done on each location, claim, or for its benefit, must be made on placer as well as lode claims.

This case, as well as that of Chambers vs. Harrington (111 U. S. 353) also holds that the showing must be made to the jury that such work, or at least some work, must have been done on it for the benefit of each discovery claim, in order to hold the same from relocation, and sustain the right of possession in an application for a patent. In the latter case, after referring to the complete security of promissory rights under mining regulations, where no patent is sought, the following language is used.

These mineral lands being thus open to the occupation of all discoverers, one of the first necessities of a mining neighborhood was to make rules by which this right of occupation should be governed as among themselves; and it was soon discovered that the same person would mark out many claims of discovery, and then leave them for an indefinite length of time without further development, and without actual possession, and seek in this manner to exclude others from availing themselves of the abandoned mine. To remedy this evil, a mining regulation was adopted that some work should be done on each claim in every year, or it would be treated as abandoned.

"In the statutes we are considering, Congress,

when it came to regulate these matters and provide for granting a title to claimants, adopted the prevalent rule as to claims asserted prior to the statute; and as to those made afterwards, it required one hundred dollars' worth of labor or improvement to be made in each year on every claim. Clearly this purpose was the same as in the matter of similar regulations by the miners, namely, to require every person who asserted an exclusive right to his discovery or claims to expend something of labor or value on it as evidence of his good faith, and to show that he was not acting on the principles of the dog in the manger.

"When several claims are held in common, it is in the line of this policy to allow the necessary work to keep them all alive to be done on one of them. But obviously on this one the expenditure of money or labor must equal in value that which would be required of all the claims if they were separate or independent."

In this case there were three successively acquired claims supposed to be located on the same lode. The amount of \$300 was found by the court to have been expended by locating the main shaft on one, during the year in which the abandonment of another of said claims was alleged, which work was also found by the court to have been done for the benefit of the three, and the title was sustained against an attempted re-location of part of the ground.

The Secretary of the Interior draws from these cases the conclusions:

1. That when application is made for patent upon a mining claim embracing several locations, an adverse claimant may prove abandonment of any one of such locations by failure to make annual expenditure upon it, or upon a common claim for its benefit, and the possessory right will fail, even though the adverse claimant may not show in himself a good adverse claim by reason of a like failure. And this accords with the Act of March 3, 1881. (21 Stat., 505.)

2. That compliance "with the term of this chapter, as a condition for the making of application for patent according to Section 2325, requires the preliminary showing of work or expenditure upon each location, sufficient to the maintenance of possession under Section 2324, either by showing the full amount for the pending year, or if there has been failure, it should be shown that work has been resumed, so as to prevent relocation by adverse parties after abandonments.

This renders unnecessary any extended review of the provision of Section 2325, requiring the further showing, "that five hundred dollars' worth of labor has been expended or improvements made upon the claim by himself or his grantors." This is not saying that in any case at least that amount shall have been expended to entitle him to patent, though for a single location one hundred dollars per year would protect the possessory right. That more than one such location may be embraced in an application for patent is clear from the cases quoted, and also from Smelting Company vs. Kemp, (104 U. S., 636) where the question was directly brought in issue, and wherein all these terms "location," "claim," "mining claim," etc., are elaborately discussed, and specifically defined, and wherein the distinction is very clearly drawn between the limitations upon the quantity that may be embraced in one location, and that which may be included in a single patent, and the often variant and different meanings of the words "claim" and "mining claim" are cited and distinguished. The construction of Sections 2324 and 2325 on this point must be considered by these decisions as settled: wherefrom it follows that as Section 2325 only directs proof of expenditure to the amount of five hundred dollars by certificate of the Surveyor General on the claim embraced in the application for patent, it must be error to hold that it further requires that amount on each individual original location, in lieu of the amount already provided for by Section 2324.

The Secretary of the Interior thinks the circular instructions of Dec. 9, 1882, and the first requirement of the circular of June 8, 1883 under which these applicants were rejected, are erroneous, and he now overrules them. With respect to the ruling in the present case, that it was not competent for the Good Return Mining Company to relocate the claim purchased from parties who many years ago made locations which were never recorded and never adjusted to the public surveys, such relocation

having been made, so far as shown by the allegations, not for the purpose of evading annual expenditure, but for better and legal description, and in order to enable the owner to proceed and obtain patent, the Secretary is of the opinion that said ruling is not well grounded in law and works essential hardship. There is nothing to indicate whether the original discovery was before or after 1872. Nor is there any showing as to the number of original discovery claims, and annual expenditures upon each so as to prevent its relocation by anybody "in the same manner as if no location of the same had ever been made." If no location had ever been made, the manner of this location and recording was precisely in accordance with law. It conforms to the requirements of Sections 2329, 2330 and 2331, respecting placers upon surveyed lands. The Secretary sees no objection to the receipt and publication of the application as a basis for entry, subject to the filing of adverse claims and the usual proceedings, as in other cases.

Mine owners will be pleased at the tenor of this decision, relieving them, as it does, in certain cases, of unnecessary expense.

More Mines to be Re-worked.

A group of mines, 34 in number, situated near Aurora, Esmeralda county, Nevada, has lately been taken by an English syndicate of London, England. A company has been formed, called the Esmeralda Consolidated (limited) of London; capital, £500,000. The parties owning the properties accept paid up shares of the company, instead of cash.

Thirty of these mines are gold-producing, the remainder principally silver. Some of these mines were worked a number of years since, and about \$14,000,000 extracted. Some have been simply prospected, and tunnels run into them.

A group of twelve mines are called the New Esmeralda properties; eight are known as the Middle hill mines; six are on Martinez hill; others are the Humboldt, Humboldt West, Del Monte, Wide-west, and Pond, on Last Chance hill, Esmeralda and two extensions thereof. The last named mines yield principally silver. A large brick mill, originally built for the Antelope mine and which cost over \$200,000, is included in the purchase.

Mr. Alfred E. Ann, of London, is the promoter of the company, and the reports of the experts engaged by him, among whom was Mr. P. N. Mackay, mining engineer, well known on the Comstock, are very satisfactory.

The mill will be ready for work in about 60 days, when active operations will be commenced. Three hundred and seventy-five thousand dollars has been put up by the company for working capital.

Foundry Notes.

The Pacific Iron Works, though by no means running to their full capacity, have lately been turning out a very considerable amount and variety of mining machinery, some of the principal orders being as follows: A ten-stamp gold mill for the Southern Belle Mining Co. of Arizona, with pumping machinery, including 9000 feet of pipe; a five stamp mill for the J. H. Berger mine of Arizona; chloridizing furnaces and dryers for the Iron Mountain Mining Co.; chloridizing furnaces for the Giant Mining Co., of Nevada; pans, settlers, etc., for the Silver King Co. of Arizona; hoisting works for the Starlight Co. of El Dorado; hoisting works for the St. Louis & Yavapai Co. of Arizona; a 30 ton lead smelting plant for the Rio Grand Dolores mine of Sinaloa, Mexico; a 30-ton copper plant for the Anglo Mexican Co. of Sonora, Mexico; a 30-ton copper plant for the Anglo-Mexican Mining Co. of Sonora, Mexico; a 30-ton copper smelting plant for the Trinidad Co., of Sonora, Mexico; three 30-ton smelting plants for the Sunny Corner Co. of Australia.

This firm are also sending out a large number of Duncan concentrators. Among the mills recently equipped with these machines are the Amador Queen, Amador county; Ulica mill of Calaveras county; Pilgrim mill of Plumas county; Plumas-Eureka mill of Plumas county, as well as various shipments to South America, Central America, Australia, etc.

THE Richmond Consolidated mine, of Eureka, Nev., has paid its first dividend for year, amounting to \$62,500.

Electrical Activity of Ore Bodies.

Carl Barus, of the U. S. Geological Survey, has communicated to the American Institute of Mining Engineers a revision, with changes and additions, of his contribution to the "Geology of the Comstock Lode," G. F. Becker, Geologist in Charge, one of the monographs of the survey. The contribution referred to was on the electrical activity of ore bodies. The experiments were made at the instigation, and under the general direction, of Prof. Becker, who has for some time given detailed attention to the possible electrical activity of ore bodies. The physical work was intrusted to Mr. Barus. Several methods of determining the question had been suggested, but the method adopted considers the ore body as a source of electrical current, and then from a study of the nature and conditions of this flow endeavors to arrive at certain specific effects, referable only to the ore body.

In determining to make the study of local currents a part of the program of the work to be done under his charge, Mr. Becker had selected both the Comstock lode and the Eureka district as available localities in which to test the applicability of an electrical method as an aid to prospecting. The former is a fissure vein, in which the ore, comparatively free from base material, is scattered irregularly through a quartz gangue. At Ruby Hill, Eureka, the ore is principally plumbic carbonate and sulphide, and oxide of iron—the whole containing more or less silver and gold—occurring, moreover, in huge, apparently isolated masses in limestone. In most of the cases, fissures containing vein-matter and connecting the chambers have been traced. The facilities offered for the prosecution of the investigation by the Eureka deposits were, therefore, to all appearances, unusually great. The immense ore bodies in sight were, furthermore, at a mean distance of not more than 400 feet from the surface, and a series of electric surveys could easily be carried out over, through and under them. Finally, it appeared not at all improbable, inasmuch as the ore bodies in places extend to within 100 feet from the surface, and are, in fact, to some extent (on Ruby Hill) above the mean surface of the surrounding country, that local electrical currents might actually be detected on the surface itself. In consideration of this encouraging prospect, due pains were taken to work up all the experimental details with corresponding care.

Above all things, it was necessary to devise some method of obtaining electric contact between the ends of the metallic circuit and the rocks, which would be free from the difficulties met with in the Comstock. Metallic plates, etc., used alone, are objectionable; but it is clear that through the intervention of a suitable liquid, effects of polarization, etc., can be avoided. The following contrivance, based on the well-known excellence of amalgamated zinc in a zinc sulphate solution, for the purpose in question, was finally adopted.

Into a large cork, *a*, 1 to 1½ inches in diameter, Fig. 1, (longitudinal section) is inserted a strip of amalgamated zinc, *z*, about one-half inch broad, to the top of which a gutta-percha covered copper wire, *h*, is soldered. Throughout the greater part of its length, it rests against a stick of wood, *cd*, cylindrical above at *c*, which end is to be thrust through a perforation in the cork *a*, and wedges-shaped below at *d*. At *i* the wire and stick are firmly tied together. A smaller cork *b* secures the lower end of both zinc and stick. The whole is surrounded by a piece of beef-gut (free from salt), tied to the corks *a* and *b*, as shown in the cut.

Into the bag (6 to 10 inches long) thus formed, is poured a solution of zinc sulphate, the under plug being for this purpose removed, and a small funnel inserted. On replacing the plug, the terminal is ready for use. The object of the stick is to obviate accidents due to breakage of the zinc, this material becoming very brittle by amalgamation.

Fig. 2 represents the terminal in place. A suitable hole, 6 to 9 inches deep and 1 to 1½ inches in diameter, is drilled into the rock or vein at an angle of about 30° with the vertical, and filled with a solution of sodic sulphate or water; whereupon the bag is introduced as shown in the figure. The dotted line *m n* indicates the level of the outer liquid, that is, the solution poured into the hole. Solution of sodic sulphate was at first used because it

increases the conductivity, and is not acted upon appreciably by the rock (limestone). It was found, however, that ordinary water which had previously been placed in contact with zinc for some time, so as to precipitate all dissolved matter which might act upon it, was far preferable. When not in use, the bags were preserved in a glass vessel, containing a zinc sulphate solution. During the observa-

used almost exclusively, the whole circuit, nevertheless, being suspended in air from threads, as in the Comstock. In the long circuit on the 600 foot level it was, however, necessary to employ cotton-covered wire for part of the line, the supply of the other being insufficient. This could be done without disadvantage, as follows: A hollow cylinder of gutta-percha, stripped from the end of wire cov-

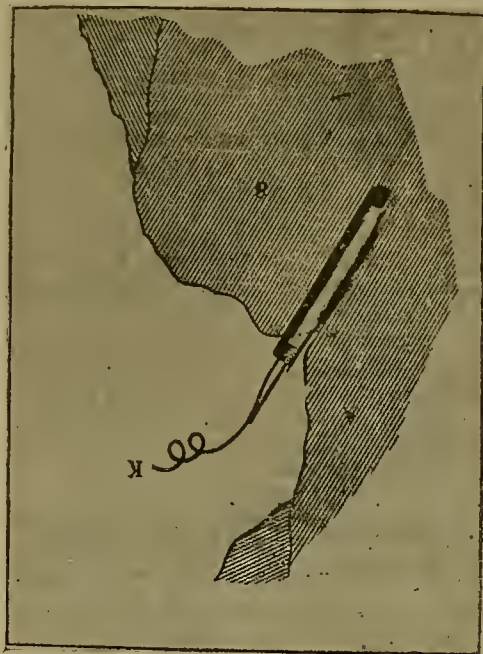


Fig. 1.—TERMINAL, LONGITUDINAL SECTION.

tions, however, they were transported from place to place in jars containing water. It was desirable during the observation to have the outside of the bag as free from zinc sulphate as possible.

The electromotive force between two similar bags placed in the same external liquid was

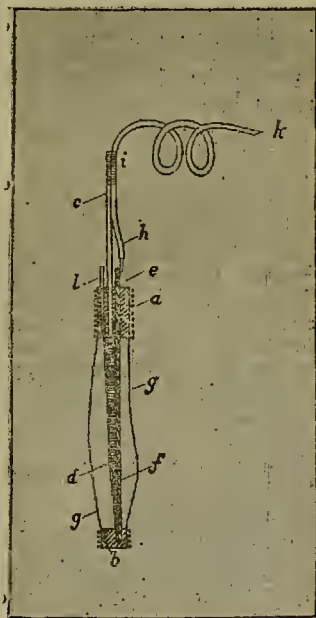


Fig. 2.—TERMINAL IN POSITION.

seldom found to be greater than 0.005 volt, usually much less and tolerably constant; whereas the electromotive force of polarization, due to the action of a Daniell under circumstances actually met with in the mine, a number of data being in hand, was in no case as large as



Fig. 3.

0.001 volt, in the experiments cited falling below this limit. Out of curiosity, the bags in a particular instance were filled with water instead of zinc sulphate, when an electromotive force of polarization of 0.020 volt was obtained.

Gutta-percha covered wire No. 19, of excellent quality (Tillotson & Co., New York), was

erred with this substance, was bent in the form of a loop, Fig. 5, and kept heat in this way by a thread passed through its interior and tied. The cotton-covered wire used (*ab* in figure) was passed through this loop, suspended by the other end of the thread.

A case in which gutta-percha covered wire trailed on the ground a distance of about 1000 feet, was made the subject of measurement. The leak was quite perceptible; the insulation offered, however, was about 1,000,000 ohms.

In extending the line from point to point, Reich's plan offers great convenience. For this purpose, the wire is wrapped on a light wooden reel, but in such a way that the inner end also remains accessible. The outer end being in connection with the measuring apparatus, enough wire is uncoiled to reach the desired hole, and a connection (contact-bag) between this and the inner end of the wire is then made. In the damp atmosphere, the reel soon became saturated with moisture, and, in spite of the insulation of the wire, care had to be taken to insulate the reel also.

For the measurement of intensity, Dr. Barus was fortunate in securing a magnificent instrument, made for him after the Wiedemann pattern, by Mr. Wm. Grunow, of New York. This instrument is exceedingly convenient for the purpose, as by an adjustment of the coils, the sensitiveness can be varied over a very wide range. Readings were made with telescope, mirror and scale.

The simple method of consecutive substitution for the measurement of electromotive forces—inasmuch as while there were no reasons for abandoning it there were a great many in its favor—was adopted here, as in the Comstock. The coils of Grunow's galvanometer could easily be so placed as to enable the observer to measure with sufficient accuracy both the lode-current and that due to the latter and the normal electromotive force conjointly, without making any change at the instrument or inserting auxiliary resistances. By means of an inclosed mercury commutator, the current in the galvanometer could be reversed and the deflection thus doubled. All intensities were determined as a mean of five consecutive commutations—not that it was desirable or necessary to increase the accuracy by such a process, but because it appeared essential not to hurry the measurements and to test the constancy of the current as appearing in the five data obtained. Errors from condensation of moisture on the commutator were avoided by excluding the latter entirely from time to time, the measurements being made by simply connecting the wires with clamp-screws. Space forbids our going into detail of results, the object here being to describe the apparatus employed for obtaining the observations.

A Boiler Explosion at Lake Merced.

A disastrous boiler explosion occurred last week at the Lake Merced pumping works of the Spring Valley Water Works, killing two men and wounding others. The explosion set fire to the ruins, which were burned, despite the heavy rains. Pieces of the boilers were found 1500 feet away from the building. There were two engines in the house capable of throwing 10,000,000 gallons of water daily to an elevation of 305 feet. They were completely destroyed. The works supplied what is known as the middle district of the city, lying west of Valencia street, and including a strip of four blocks running parallel with Market street, extending westward from Montgomery. Superintendent Lawrence, of the water works, estimates the damage at \$55,000. The engineer of the works, who was temporarily out of the building, and was unhurt, says, concerning the accident: "I cannot account for the explosion in any way, and have no theory about it. It was the two twin boilers nearest the engine that burst. They were cleaned on Tuesday and filled with water. We found the manhole leaking when we started up steam to-day, about two o'clock. The stream was shut off, the manhole taken out, and a new gasket put in. Then she was fired up again, and had run only an hour when the explosion took place." Wm. Johnson, the assistant engineer, who was in charge at the time of this explosion, and was slightly injured, says: "I was in charge of the engine-room at the time of the blowing-up. Mr. Williams had come to the house for a few moments. There was from 85 to 90 pounds of steam in four of the boilers, and but an instant before the crash I saw that there was only 54 pounds in the two first boilers. We were just getting up steam in them, and could not make the connection with the other boilers until we got them up to 85 pounds. Everything was running smoothly at the time of the explosion, and I am positive that there was only 54 pounds pressure in those two first boilers."

Since this accident, a meeting of the Pacific Coast Stationary Engineers has been held and the following resolutions adopted:

WHEREAS, immediately after the explosion at the tripe factory at South San Francisco, a committee of the Board of Supervisors, consisting of Farwell, Abbott and Kunkler, after carefully investigating the cause of said explosion, did present to the Board of Supervisors a report over their signatures, stating a large number of engines and boilers in this city and county were in charge of incompetent and untrustworthy persons and recommending the appointment of an inspector of boilers to examine and license engineers; whereas, the disaster at Lake Merced furnishes additional evidence, if any were needed, of the necessity for a State or municipal inspector of all steam boilers.

Resolved, That the Executive Committee of this association wait on Mr. Abbott and the members of the Board of Supervisors, individually and collectively, and once more urge them to adopt the plan presented by this association, or some other plan that will provide for some intelligent supervision of all steam boilers.

The engineers have circulated a petition asking the Supervisors to pass an ordinance to point a boiler inspector and license engineers, and they further ask all other organizations which may have a fellow feeling in the matter to aid in making it an issue in the coming municipal election.

A Coroner's jury has decided that an unaccountable accident caused the death of John Ryan and Peter Duffy, who were killed by the explosion. The owners and builders of the works were freed from blame by the jury.

At Aspen, Colorado, where there is a large smelting company, they have been taxed on the full value of ore on hand at the time of making the early assessments, amounting to \$10,000. A case on attachment is now before Judge Goddard. The smelting company desires to build an addition to the works, but will not, owing to the tax. If the tax is collected the smelter declares it will move to some other county. At a meeting of the citizens held Wednesday night, to discuss the matter, an unanimous vote that the tax be abolished, was passed.

The last steamer for China took from this port \$388,920 in silver bars, \$232,624 in Mexican dollars, \$9788 in gold coin, and \$750 in gold dust; a total of \$632,084.

The Standard Cons. mine, Bodie, employs 55 men, at a daily expense of \$225.

PRACTICAL HYDRAULICS.

NUMBER II. COPYRIGHTED.

PRINCIPLES OF HYDRAULICS.

Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

Ex. 54.—A rectangular orifice being 9 inches high and 1 foot wide in the end of a conduit, as A G F E, Fig. 16, 1 foot high, 1.25 feet wide, and 3 feet long, under a head of 3.5 feet on center, of water nominally still in tank, B A D C, what is the coefficient of discharge?

By Table 7, the coefficient of discharge due to the velocity of the water in the tank is $c_v=.609$, and given head of water nominally still is $c=.609$.

Area of orifice, $.95 \times 1 = .95$.

Area of cross-section of conduit, $1.25 \times 1 = 1.25$.

Ratio of transverse sections $n = \frac{1.25}{.95} = 1.325$.

By Table 11, the value corresponding to $n=1.325$, the ratio of transverse sections, is $\frac{c_n-c}{c} = .0208$; whence

$$c_n = 1.208c.$$

Substituting in last equation the value of $c=.609$. $c_n = 1.208 \times .609 = .736$.—Ans.

Ex. 55.—An orifice 2 feet square in the end of a conduit, A G F E, Fig. 16, 2.5 feet square, 6 feet long, under a head of 5 feet on center of water nominally still in tank, B A D C, what is the discharge in cubic feet per second?

Cal. 1st.—By Table 7, the coefficient of perfect contraction applicable to an orifice 1 foot wide, 2 feet high, under a head of five feet of water nominally still, is $c=.612$.

By Rules 28 and 29,

Part suppressed (both ends) $2 + 2 = 4$ feet.

Entire perimeter (tabulated orifice) $1 + 1 + 4 = 6$ feet.

Ratio of entire perimeter to part suppressed $= \frac{6}{4} = 1.5$, 1.43 times this ratio; $0.143 \times 1.5 = .0953$.

Sum of 1 and this product $= 1.0953$.

This sum, multiplied by tabulated coefficient, $1.0953 \times .612 = .670$.

0.143 times the product of the coefficient of perfect contraction, and the ratio of the entire perimeter of the orifice 1 foot wide to the part suppressed, divided by the breadth of the given orifice, $0.143 \times .612 \times \frac{4}{2} = .029$.

Coefficient due given orifice (2 feet square) under head of still water:

$$c_b = .670 - .029 = .641.$$

Area of given orifice, $2 \times 2 = 4$ square feet.

Area of cross-section of conduit, $2.5 \times 2.5 = 6.25$ square feet.

Ratio of transverse sections, $n = \frac{6.25}{4} = 1.5625$.

By Table 11, the value corresponding to $n=1.5625$, the ratio of transverse sections is $\frac{c_n-c}{c} = .241$.

By interpolation between values corresponding to $n=.60$, and $n=.65$, there results approximately:

$$\frac{c_n-c}{c} = .234; \text{ whence,}$$

$$c_n = 1.234c.$$

Substituting the value of $c_b=.641$, as before found, in the last equation, and there results:

$$c_n = 1.234 \times .641 = .791.$$

By Table 6, square root of head $5 \sqrt{5} = 2.236$.

By Rule 27, $Q = .791 \times 8.025 \times 4 \times 2.236 = 56.78$ cubic feet.—Ans.

Cal. 2d.—By Table 7, the discharge found for an orifice 1 foot wide, 2 feet high, under a head of 5 feet, is 21.98 cubic feet per second.

If it be assumed, that for practical purposes, the discharge through the given orifice 2 feet square, in example 55, will be proportionate to the tabulated discharge, there will result:

$$Q = 21.98 \times 2 = 43.96 \text{ cubic feet per second.}$$

By comparison, it is seen the result by Cal. 1 is nearly 30 per cent greater than that obtained by Cal. 2d.

This discrepancy seems to illustrate the necessity of careful investigation in essaying the determination of problems of practical hydraulics, however tedious the process may be.

COEFFICIENT OF THE FLOW OF WATER THROUGH A VERTICAL RECTANGULAR ORIFICE, UNDER A HEAD IN MOTION.



FIG. 17.

The case in which the head of water is in motion, occurs for the most part in open channels. In Fig.

17, A B C D represents a vertical section lengthwise of a stream of water in an open channel. B C a dam across the stream, in which is an orifice, E F in height. The dam is assumed to act as a restraint, but not sufficient to sensibly affect the mean velocity of the stream of water above it.

Let c =coefficient of discharge under a head of water, nominally still.

c_n =coefficient of discharge under a head of water in motion, and dependent for its value on the ratio n .

A=area of orifice.

A_c =area of cross section of canal on channel.

$$n = \frac{A_c}{A} \text{ ratio of these areas, not exceeding } \frac{1}{2}.$$

Weisbach gives as the result of his experiments, the head being measured 1 metre=3.28 feet above the dam.

$$\frac{c_n-c}{c} = 0.641 \left(\frac{A}{A_c} \right)^2 = 0.641 n^2, \quad (104)$$

whence,

$$c = (1 + .641 n^2) c. \quad (105)$$

TO FIND THE COEFFICIENT OF DISCHARGE UNDER A HEAD OF WATER IN MOTION.

Rule 30.—Add 1 to .641 times the square of the ratio, of transverse sections—that of the canal to that of the orifice—and multiply this sum by the coefficient of discharge due the given orifice and given head as though it was in still water.

Rule derived from formula. (105)

TABLE 12.

Corrections of the Coefficients of Flow Through Rectangular Orifices Under a Head of Water in Motion. Weisbach.

$n \dots$	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
$\frac{c_n-c}{c}$	0.002	0.006	0.014	0.026	0.040	0.058	0.079	0.103	0.130	0.160

Ex. 56. A dam containing a rectangular orifice 5 feet wide, 1 foot high, put across a flume 6 feet wide, raises the water 5 feet in height above the bottom of the flume, and 3.5 feet above the lower edge of the orifice. What is the discharge in cubic feet per second?

Cal. 1st.—Half height of orifice=.5 feet.

Head on center $3.5 - .5 = 3$ feet.

Area of orifice $5 \times 1 = 5$ square feet.

Cross section of flume, $6 \times 5 = 30$ square feet.

Ratio of transverse sections $\frac{30}{5} = 6$.

Square of ratio $(6)^2 = 0.278$.

By Table 7. Coefficient of perfect contraction for an orifice 1 foot wide, 1 foot high, under a head of 3 feet is=.605.

By Rule 28.—Part (both ends) suppressed $1 + 1 = 2$ feet. Entire perimeter (tabulated)=4 feet. Ratio of entire perimeter to part suppressed, $\frac{4}{2} = 2$, 1.43 times this ratio; $1.43 \times 2 = .0715$. This sum multiplied by .605 the coefficient of perfect contraction, gives the value of the coefficient of partial contraction when the contraction of both ends is suppressed.

$$c_n = 1.0715 \times .605 = .648$$

By Rule 29.—0.143 times the product of the coefficient of perfect contraction and the ratio of the entire perimeter of the orifice 1 foot wide, to the part suppressed, divided by the breadth of the given.

$$0.143 \times 5 \times .605 \div 5 = .009,$$

whence:

$$c_b = .648 - .009 = .639.$$

Substitute the value of $c_b=.639$ for c , and the value of the square of the ratio; $(\frac{1}{6})^2 = .0278$ in formula (105) or employ Rule 30.

$$c_n = (1 + .641 \times .0278) \times .639 = .650$$

By Table 6:

Square root of given head of 3 feet=1.732.

By Rule 27:

$$Q = .650 \times 8.025 \times 5 \times 1.732 = 45.17 \text{ cubic feet per second.} \text{—Ans.}$$

Cal. 2d. By Table 7. The discharge found for an orifice 1 foot wide, 1 foot high, under a head of 3 feet is 8.41 cubic feet per second. If it be assumed that for practical purposes the discharge through the given orifice, 5 feet wide, 1 foot high, in example 56, will be proportionate to the tabulated discharge, then will result

$$2 = 8.41 \times 5 = 42.05. \text{—Ans.}$$

Discrepancy of 3.12 cubic feet, or $7 \frac{1}{10}$ per cent.

FLOW OF WATER THROUGH SHORT TUBES.

Short tubes or adjutages are cylindrical, conical or compound in form.

Cylindrical Tubes.—The length of a cylindrical tube being from 2.5 to 3 times its diameter, the mean coefficient of flow through it as determined by the experiments of Bidone, Eytelwine, D. Aubuisson and Weisbach, is .815, while under otherwise similar circumstances, the mean coefficient of discharge through

an orifice in a thin plate is .615. The ratio of .815 to .615 is 1.325; that is, the discharge through a short tube of the given proportions (2.6 to 1), is 1.325 times as much as the discharge through an orifice of equal diameter in a thin plate. For practical purposes this ratio may be assumed general in its application without material error; hence,

To find the coefficient for a short tube, having given the coefficient of an orifice in a thin plate, of equal diameter, and under an equal head.

Rule 31.—Multiply the given coefficient of the orifice by 1.325.

Ex. 57.—The diameter of a short tube—length to diameter as 2.6 to 1—being 6 inches, and the head 9.06 feet, what is the coefficient of discharge?

Cal.—Given diameter $6'' = .5$ feet.

By Table 9, coefficient due orifice, .5 feet diameter, under 9.06 feet head=.602.

By Rule 31, $.602 \times 1.325 = .798$.—Ans.

In case there are no experiments on which to rely, the mean coefficient .815 is to be employed.

Let d =diameter in feet of a cylindrical tube whose length is from 2.5 to 3 times the diameter.

h =head of water on center.

$c=.815$, coefficient of discharge.

$a=.7854d^2$, area of cross section of tube.

Q =discharge in cubic feet per second.

Substituting the values of a , c and $h=h$, in equation (92).

$$Q = .815 \times 8.025 \times .7854 d^2 \sqrt{h}. \quad (106)$$

Whence,

$$Q = 5.137 d^2 \sqrt{h}. \quad (107)$$

To find the flow of water through a cylindrical tube whose length is from 2.5 to 3 times the diameter.

Rule 32.—Multiply the square root of the head of water on center by 5.137 times the square of the diameter of the tube.

Rule 32 derived from equation (107).

Ex. 58.—A tube being 3 inches in diameter and 8 inches long, and the head of water in the center being 5 feet, what is the discharge in cubic feet per second?

Cal.—Diameter $3'' = .25$ feet.

Square of diameter $.25 \times .25 = .0625$ square feet.

By Table 6. Square root of head; $\sqrt{5} = 2.236$.

$Q = 5.137 \times .0625 \times 2.236 = .718$ cubic feet.—Ans.

In case the proportion of length to diameter is much changed, as 1 to 1, the coefficient of flow is nearly the same as that for a thin plate, or if the length be much increased over three times the diameter, the coefficient .815 becomes diminished according to the occurrence of friction of the sides of the lengthened tube, which is termed a pipe.

Conical Tubes.—Conical tubes are convergent or divergent. The outer orifice being smaller than the inner, the tube is convergent; but if larger, the tube is divergent.

Convergent Tubes.—Extensive experiments have been made by D. Aubuisson and Castel on the flow of water through convergent tubes. These were made with tubes of various sizes and proportions; but mostly with those .61 inches diameter at the discharging end, 1.59 inches at the inlet end, and under a head of water 9.84 feet. The results of their experiments, as stated by Weisbach, are given in the following table:

TABLE 13.

Coefficients of discharge and velocity for flow through conically convergent tubes. Smaller diameter=.61 inches.

Angle of Convergence	Coefficient of Flow.	Coefficient of Velocity.	Angle of Convergence	Coefficient of Flow.	Coefficient of Velocity.
0° 0'	0.829	0.829	13° 24'	0.946	0.963
1° 36'	0.866	0.867	14° 28'	0.941	0.966
3° 10'	0.895	0.894	16° 36'	0.938	0.971
4° 10'	0.912	0.910	19° 23'	0.924	0.970
5° 26'	0.924	0.919	21° 0'	0.919	0.972
7° 52'	0.930	0.932	23° 0'	0.914	0.974
8° 58'	0.934	0.942	29° 58'	0.895	0.975
10° 20'	0.938	0.951	40° 20'	0.870	0.980
12° 4'	0.942	0.955	48° 0'	0.847	0.984

Ex. 59. The smaller diameter of a conically convergent tube being 6 inches, the angle of convergence $5^\circ 26'$ and the head of water on center 9.06 feet, what is the flow of water in cubic feet per second?

Cal.—Diameter 6 inches=.5 feet.

By Table 9 the coefficient corresponding to the given diameter and head=.602, and coefficient corresponding to .61 inches on which Table 13 is based=.618.

By Table 13 the coefficient corresponding to the given angle of convergence $5^\circ 26'$ is=.924.

Ratio of coefficients $.602 \div .618 = .974$.

Then coefficient of flow due the given diameter $.924 \times .974 = .900$.

And cross section of tube $.5 \times .5 \times .7854 = .1963$ square feet.

Lead Smelting—No. 4.

Ore Buying.

Ore is purchased either directly from the mines themselves for cash or from sampling works, which either buy from the mines or act as their agents. Various considerations affect the price paid. From the assay value of the ore in silver a certain percentage is deducted for loss in smelting, which varies according to the nature of the ore, whether siliceous, ferruginous, or sulphureted, or according to a special arrangement made between the mine owners and the smelter owners. A further variable change is made for cost of treatment, which is dependent on the nature of the ore and its tenor in lead. As a general rule in regard to oxidized ores, the charge for treatment is lower the larger the percentage of lead they contain. When this tenor is between 5 and 30 per cent, the lead is paid for at from 15 to 45 cents a unit of 20 pounds; the higher the percentage of lead the higher the price paid per unit. When the ore contains less than a certain percentage of lead, which varies with the quality of the ore, the mine owner receives no remuneration for the lead contained in his ore, however rich it may be in silver. The following table gives a specimen of the rates charged for treatment of the ores of some of the best-known mines, the deduction made for the loss of silver, and the price paid for each unit of lead above the certain percentage:

NAME OF MINE.	Deduction for loss of silver, smelting.	Cost of treatment per unit of 20 lbs.	Price of lead per unit of 20 lbs.
Amble.....	10 per cent	\$25 00	\$9 25
Chrysolite.....	5 "	20 00	25
Dunkin.....	5 "	22 00	25
Carbonate.....	7 1/2 "	20 00	25
Evening Star.....	7 1/2 "	28 00	25
Morning Star.....	5 "	15 00	30
Iron.....	5 "	18 00	30
Tucson.....	5 "	21 00	25

These figures vary from month to month unless a time contract has been entered into, and are governed by the market quotations of silver and lead at New York and the prices of coal, charcoal, and fluxes of Leadville. Gold, when present in excess of one-tenth of an ounce to the ton, is paid for at the rate of \$18 per ounce. The transportation of ore from the mines to the sampling or smelting works is paid for by the smelters at the rate of \$1 to \$1.85 per ton.

Sampling.

When the ore arrives at the sampling works, it is weighed in the wagon on scales generally occupying a detached building. It is then thrown into bins or piles in the open yard, every tenth shovelful as a rule being put into a wheelbarrow. The sample thus obtained is spread out on the sampling floor and in the case of a sand ore is worked up directly to obtain a thorough mixture. Hard ores are first passed through Cornish rolls. When the ore is thoroughly mixed, it is repeatedly quartered till a sample convenient for drying has been obtained. After drying it is further crushed, mixed, and quartered, and a portion is then ground on the hucking plate by the bucker (a) until it passes through a sieve of 70 to 80 meshes to the linear inch. The sample is then divided into three portions, one of which is assayed at the smelter, and the second at the mine or by a public assayer who may be employed by the mine. If the results of the two assays agree closely, a mean is generally taken as the true value of the lead; otherwise the third portion is sent for control to a third independent assayer. Sand ores require no crushing before charging into the furnace. For hard ores, slags, fluxes, etc., Blake, and occasionally Alden crushers, driven by steam-power, are employed.

FRANCE AND GERMANY.—Unfavorable comments are often made in regard to the industrial progress of these two countries—Germany being usually placed far in the lead of France. Instance the following:

France is not prosperous. Allowing for the million and a half taken away by Germany, the population has made no progress at all since 1860. Its numbers are smaller now than they were fifteen years ago, while the load of taxation has almost doubled—in mere charges it has much more than doubled. Equally stationary has been the export trade. The average of recent years has indeed been lower than for the years immediately succeeding the war. Imports have, on the other hand, augmented much, but not because the country has been internally prosperous. The increase is the consequence of bad harvests, and indicates a further denudation of the wealth of the people.

Notwithstanding the above and many similar comments of the press, Mulhall in his statistics—than whom there is no better authority—says that the annual accumulation of wealth in France is \$335,000,000, while that of Germany is but \$200,000,000. This is all the more striking when it is observed that the population of Germany is 45,000,000 against 37,000,000 for France.

OKLAHOMA.—Senator Van Wyck has introduced a bill to provide for the organization of that part of the territory of the United States now known as Indian Territory, and the public land strip into a Territory, to be known as the Territory of Oklahoma; to provide a temporary government for the same; for the allotment of homesteads to Indians in severalty, and to open the unoccupied lands to settlers.

USEFUL INFORMATION.

Metallic Carriage Wheels.

A great many people, no doubt, have wondered, says the *Age of Steel*, why the ordinary bicycle wheel, with slight modifications, could not be used to advantage on buggies and carriages—why, with some strengthening of the spokes and the substitution of the metal for the rubber tire it could not be made to do service in the latter capacity quite as acceptably as in that to which arbitrary custom has confined it. For apart from there being no obvious and insurmountable objections to such enlargement of its uses, good reasons can be brought forward to favor the change. These latter need not be touched upon now; they will occur to most anyone upon a little reflection.

The journal above quoted says that a company has already been formed, which is now at work turning out 100 sets of carriage wheels with steel spokes resembling in general construction the ordinary bicycle wheel. These wheels will be used on the streets, and will afford the first opportunity of judging of the merits of metallic wheels on carriages. Some of the wheels have already been made, and are said to appear remarkably strong, much more elastic, and ten per cent lighter than the ordinary wooden carriage wheel.

The wheel is described as follows: The hub is composed of three pieces, and is held together by the axle box, terminated at one end by a nut. The two rows of spokes are held in place between the central piece of the spoke and the two outer pieces of the same, the inserted ends being headed. The outer ends of the spokes are passed through the felloe and adjusted to the tire by a screw thread, by which contrivance equal tension is secured on all the spokes. The distance apart of the two rows of spokes at the hub is 2 1/2 inches, securing what is called a regular "truss." The spokes in the 44-inch front wheel are 16 in number, and in the 48-inch hind wheel 18. They are each 1/4-inch in diameter, and of a quality of steel possessing a tensile strength of over 2000 pounds. The hubs of the wheels are of the best quality of malleable iron.

The advantages claimed for this wheel are greater durability, lightness of weight, and greater cheapness in the making of repairs. Another feature wherein this wheel differs from the wooden is that the load is always suspended upon it, as in the case of a bicycle, instead of resting only on that part of the wheel directly underneath. Practically the upper part of the wheel, with the aid of the tire and the felloe, carries all the load, which is exactly the reverse of what happens in the case of the wooden wheel. This distribution of weight over the whole wheel checks necessarily the tendency to elongate over the surface of the lower half.

Paper-Hangings and Curtains from Leather.

Many persons have doubtless noticed articles going the round to the effect that paper-hangings for reception rooms, libraries, and even for palace-car curtains, are now being made entirely from leather scraps, or at least covered or embossed with leather. It is true that waste leather is used for the purpose, but only to a limited extent, the cost and difficulty of manufacture having thus far prevented capitalists from putting up much money on it. In order to give permanency to the process, consideration must be had for the inequalities of each and both substances, for it must be remembered that the difference in expansion, contraction, susceptibility to the alternate influences of heat and cold, dryness and moisture, to which this "new candidate" will ever be subjected, will remain as apparent when brought together by any mechanical means as when separate. It follows, then, that varieties of each substance, out of which it is desired to make these novel goods, must be selected possessing the greatest number of characteristics, both physical and others, in common, and then, if some principle of chemistry can be brought to bear by which certain affinities may be brought in combination, permanent success is only a question of time, and, when once it has been attained, cost will soon be reduced to the minimum. Experiments are now being made with chemical fiber and pulp from scrap leather, the results of which, whether successful or not, will appear at another time. It is understood that the new material departs in several important particulars from the character of leather board with which paper-makers are familiar.

AN OCEAN STEAMER'S PROVISIONS.—An ocean passenger steamer is provisioned as follows, for the passengers and crew: Three thousand five hundred pounds of butter, 3000 hams, 1600 pounds of hicknuts, exclusive of those supplied for the crew, 8000 pounds of grapes, almonds, figs and other desert fruits; 1500 pounds of jams and jellies; tinned meats, 6000 pounds; dried beans, 3000 pounds; rice, 3000 pounds; onions, 5000 pounds; potatoes, 40 tons; flour, 300 barrels; and eggs, 1200 dozen. Fresh vegetables, dead meat and live bullocks, sheep, pigs, geese, turkeys, ducks, fowls, fish and casual game are generally supplied at each port, so that it is difficult to estimate them. Probably two dozen bullocks and sixty sheep would be a fair average for the whole voyage, and the rest may be

inferred in proportion. During the summer months, when traveling is heavy, twenty-five fowls are often used in soup for a single dinner.

HOW TREES DIE.—A contemporary remarks: When Dean Swift facetiously predicted that he would die like a tree, by "going off at the top," anticipating the failure of his mental powers, he correctly described the beginning of natural decay in trees. There are exceptions, but as a rule the visible signs of decay begin at the top. The cause of decay may lie elsewhere, but the top limbs are the first parts that become paralyzed. The enfeebled vitality is unable to drive the sap to the extremities, the pores being choked up, and the limbs die. This is apparent in mostly all plants and trees that die what may be called a natural death. At all times the circulation and the vitality is weakest at the extremities, just as in animals, and it may almost always be noticed that most injury from cold is done, not always to the most exposed parts, but to the extremities of the shoots. It is this vigor, the nearer we get to the root, which has no doubt led cultivators to suppose that cutting a limb back puts strength into a plant, but the idea is quite erroneous. Undoubtedly the further we cut back at the right season the stronger does the shoot grow for a certain distance, but no additional strength is added. What was wanting before cannot be put there again by the removal of any portion of what is left.

TO DETECT FIRE DAMP.—All kinds of ingenious contrivances have been brought forward at different times for the detection of fire-damp in mines, but most of them have been of a very complicated nature. The last of the series, however, is so simple, that it seems astonishing that no one thought of it before. A child's india-rubber ball with a hole in it, is squeezed flat in the hand and held in the place suspected of fire-damp while released, and allowed to suck in the sample of the air. The ball is now directed toward a safety lamp, and again squeezed, when the tell-tale blue flame will show if it contains any inflammable vapor.

POWER FROM SHAFTING.—A firm which makes a specialty of the erection of shafting, states that its experience teaches that the loss of power due to improper conditions in the line shafting amounts to fifty per cent of the engine power employed, and that the defects most commonly found, are as follows: Shafting too light for the duty, crooked shafting, hangers too far apart, hanger bearings too short, pulleys too heavy and not properly balanced, hangers which are not adjustable and not self-adjusting, and sometimes filled with spurious Babbitt metal, and improper proportion between two pulleys connected by the same belt.

LEADING OCCUPATIONS.—In 1860 the wood industries employed 130,000 persons; to-day they employ 340,000 while the value of their annual product has trebled. The woolen industry employed 60,000 persons then, and now employs 160,000, while our home mills, which produced goods of the value of \$80,000,000 in 1860, now turn out an annual product worth \$270,000,000. The iron product amounted to 900,000 tons of ore; to-day it foots up over 8,000,000 tons a year, almost a ninefold increase. The silk industry employed 5000 persons; now it employs about 35,000, seven times as many.

SOLID BODIES shine in the dark, or become luminous, when heated from 600 degrees to 700 degrees F., and in daylight only when they reach a temperature of 1000 degrees.

GOOD HEALTH.

Overcoat "Colds."

This is the season most appropriate for a little serious reflection on the subject of overcoats. Nothing seems more simple than to adapt clothing to the weather by the addition of an overcoat, light or heavy, as the occasion requires. It must not, however, be forgotten that just in proportion as the garment superimposed upon the ordinary clothes is effective in producing a sense of warmth, it acts by arresting the evaporation of warm vapor from the body. This warm vapor continues to rise through the ordinary clothing, but it is prevented from escaping, and the clothes are saturated with it. The general effect is well enough while the overcoat is kept on, but the moment it is removed evaporation recommences, and the body is placed in a "cooler" constructed on the principle adopted when a damp cloth is wrapped around a butter dish, the vapor passing off, abstracting the heat, and leaving the contents of the cooler refrigerated.

The point to make clear is that the overcoat, let it be fashioned and ventilated as it may, does not prevent the underclothing from being saturated with moisture, but actually tends to make the moisture accumulate therein. This is proved by the sense of genial warmth felt while the overcoat is worn, and the evidences of perspiration, easily perceived under the arms and at the sides of the chest particularly, immediately after the overcoat has been removed. Moreover, we take off the coat when we enter a warm house, and precisely at the moment when muscular activity is suspended. A very little consideration will suffice to convince the common sense thinker that nothing can well be

worse managed than this process, both as regards its nature and the time and conditions of its operation. It is opposed to all the canons of health to allow the clothing to become saturated with perspiration, and then to take off the external covering and suffer rapid cooling by evaporation; while, if it were designed to do this at the worst possible time, probably none worse could be found than when muscular exercise has been discontinued.

The suggestion we have to offer is, that it would be far better policy to wear only one coat at a time, and to make whatever change may be necessary by removing a thin coat and replacing it by a thicker one, when going out of doors, and the reverse when coming in. If, instead of wearing overcoats, people would wear coats of different thicknesses, according to the conditions generally, they would avoid the danger of cooling by evaporation; the garments saturated with moisture would be removed, and dry off the body instead of on it. We believe no inconsiderable proportion of the "colds," attacks of lumbago, and even more formidable results of what are popularly called "chills," may be traced to the practice of wearing overcoats which arrest the ordinary process of evaporation, cause the clothing within to be saturated with accumulated perspiration, and are then removed, when rapid cooling takes place. The avoidance of this peril is to be attained by such change of coats as the conditions require.—*Lancet*.

DEATH FROM CARELESSNESS.—Two instances within one week have been reported of men being killed while walking on railroad ties in the East. One of the victims was so deaf that he could not hear the approaching train. The other was reckless enough to take the chances of being run over. Both suffered death for their temerity. Some people will never gain wisdom nor profit by the experience of the past. So it is with those who snap guns and pistols at others, in the belief that the weapons are not loaded, and discover how fatal has been their error when they see that the person aimed at has been killed. And so, also, with those who pull loaded guns from wagons, with the muzzles toward them, and receive the contents of a discharge in their bodies. These fatal accidents are recorded by the press as items of current news, but not with the expectation of always preventing them. This same sort of incaution has been the subject of notice time out of mind, and will probably continue through generations to come.

ALCOHOL AND ITS USES.—Recent investigations show that alcohol is oxidized in the system, and is converted into carbon dioxide and water, while but little is eliminated as alcohol from the system. In moderate doses it has no influence on the body heat, but in somewhat larger doses it reduces body-temperature by absorbing the oxygen and preventing it from oxidizing the tissues. It is, therefore, of use in febrile diseases in doses of 1/2 to 1 fluid ounce several times daily, until a total of 5 to 8 ounces per day has been given. The prescribing of alcohol by physicians seems to be decreasing, and the tendency also seems to be setting in favor of prescribing pure alcohol suitably diluted, rather than any of the liquors in which there are various volatile ethers, derivative mainly of fused oil, the action of which is but illy understood, but many of which probably act injuriously.

CAUSES OF DISEASE.—The chief causes of disease are sudden colds, errors in diet, errors in dress, or intemperance, drinking impure water, eating unwholesome food, defective teeth, blood poisoning from impure air, noxious gases or suppurating wounds. Disease induced from any one of these causes almost invariably manifests itself by disorder in the functions of the liver; the alarm is generally sounded there first, and if not promptly attended to the trouble is liable to extend to other vital organs. Dyspepsia, constipation, chronic diarrhoea, disease of the kidneys, dropsy, catarrh, rheumatism, consumption and various forms of skin diseases, often proceed directly from derangement of the liver.

Symptoms.—When you feel restless, melancholy and uncomfortably, with, perhaps, a dull headache, it probably proceeds from a torpid liver. When you have a sudden attack of rheumatism, it is generally due to a cold which has been brought about by an unhealthy condition of the secretions. While, as a general thing, a physician should be sent for on the first serious symptoms of sickness, Dr. Hall, in his *Journal of Health*, recommends as a prompt and a safe remedy for a cold or incipient liver derangement, "Hall's 'old time' liver pills." This, however, is not intended as a puff for those or any other pills.

DANGER FROM HYDROGEN IN ZINC DUST.—It has long been known that shippers are unwilling to carry large quantities of zinc dust in their vessels, owing to the danger of its getting moist, and becoming heated to a dangerous extent. Mr. Greville Williams, F. R. S., has recently made some researches which throw light on this matter. He finds that wetted zinc dust, after drying, gives off nearly double the hydrogen that unwetted dust gives. Hydrogen is absorbed from a moist atmosphere at moderate temperature by zinc dust. It has, in fact, the power of occluding hydrogen after the manner of spongy platinum.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

VOLCANO TUNNEL.—Amador Ledger, Dec. 26: C. S. Hohmann and C. Hoffmann report that prospects never looked better. Although much rain had fallen there the rivers had gone down with surprising rapidity. It is the intention of the managers of the mine to build a bulkhead and change the channel of the creek, so that in case of freshets water which now goes to waste could be saved. A tract, 600 feet in length, is to be built for the purpose of hauling rock for the bulkhead.

WATER WHEEL EXPERIMENTS.—The water wheel experiments which are about to be made at the Zeile mill are in the interest of the Zeile Mining Company, for the purpose of ascertaining beyond dispute which wheel is able to run the machinery with the least amount of water. A Pelton wheel has been purchased, and will be pitted against the three modifications of the Knight wheel, and whichever proves most satisfactory will be adopted at the Zeile hereafter. Over 300 inches of water is now required to run the machinery; the water bill alone costs over \$1000 per month, so that a saving of 5 or 10 per cent in water would be quite an item in the course of a year. The experiments will probably be made next week.

Butte.

MAGALIA.—Oroville Register, Dec. 23: Miners on the Magalia ridge look for a good year during 1886, and are busy preparing for it now. The Wiley Bros. and Collins are running a tunnel and otherwise prospecting their claim. At the Dyer and Babcock mine new machinery has lately been put in for the purpose of draining the mine, and work will now be vigorously pushed from this time forward. The owners have lately put up new buildings over their hoisting works, and the gravel that they have found looks well, so are long we may expect to hear of the channel being struck. Mr. Wm. Brown is opening a new claim just below Magalia. The old Willard mine will be started up in about three weeks and then work will be vigorously prosecuted on the same. At the Red Hill nothing at present is being done. The Black Channel Mining Company are pushing work, and before many months it is thought there will be some big developments. Williams & Co., near the Mineral Slide, are driving ahead, and hope to strike pay in a short time. The Mineral Slide mine has always been worked to disadvantage on account of the water in the tunnel, and now the owners are running a drain tunnel to draw off the water, so that the mine can be worked to greater advantage and at less expense than formerly.

Fresno.

AT WORK.—Fresno Republican, Dec. 29: On a trip through the mining region on the north side of the San Joaquin river, in Potter Ridge and Fine Gold mining gold districts, the writer was surprised at the extent of development made and the number of men engaged in both placer and quartz mining all through that section. A great many men are engaged in overhauling the old places, which has been made possible by the abundant supply of water. Some are making good wages, while we found many who claimed to be barely making "grub." At the old Abby mine on Lower Fine Gold great activity prevails. A substantial plant of new hoisting machinery is in operation. Preparation is being made to erect a ten-stamp mill at once, the machinery being now in course of transportation from the railroad to the mine. A quarter of a mile west from the Abby mine is situated the famous Hildreth mine. The vein, although not very large, shows a high grade of ore in all the stopes and drifts. A large steam boiler supplies steam for pumping, hoisting and running the mill. The equipment of the mine is complete. We visited the Last Chance mine of McKenzies & Rule on the north fork of Fine Gold. This mine is splendidly situated for convenience in working, and what is more attractive is the fact demonstrated by the large stores of rich ore in sight ready to be stooped out. The owners are practical miners and have stuck to this property for ten years, and by hard work and careful management have got their mine opened up quite extensively, with large reserves of ore, and have made it more than pay for development as they went along. At Quartz Mountain everything is very quiet. Contracts have been let for sinking a main working shaft to a depth of 250 feet; also about 2½ miles of iron piping has been ordered for taking water from their ditch to the quartz mill for power. At the Fresno Enterprise mine the working force, consisting exclusively of Chinamen, except a white foreman, has been principally doing exploration work for the past year, no ore of consequence having been mined. There is more activity and better returns for the work being done in Fresno mines than ever before in the history of the county.

Inyo Co.

DEFIANCE.—Independent, Dec. 26: Twenty-five tons of ore from the Defiance mine were delivered at Keeler at the beginning of the week. Mr. Reddy intends to ship about ninety tons a month. The ore goes from 85 ounces to 300 ounces silver per ton, and from 77 to 80 per cent lead. The ore body in the mine is now opened 100 feet in length, and 100 feet in depth, and of this a seam of at least two feet wide is solid galena ore, of the value given above. Outside of this seam is a very large ledge of carbonate and oxide ores, that assay from 40 ounces to 200 ounces silver per ton. All of these ores continue of the dimensions and values given as far as the openings in the mine yet extend. Work is still pushed ahead, and how much farther the ore body extends is only a matter of conjecture. Certainly there is ore enough now in sight to amply compensate Mr. Reddy for all his patience, toil and expense.

Nevada.

TO RESUME.—Foothill Tidings, Dec. 26: We are informed that there is a probability of the Massachusetts Hill mines resuming work. The numerous owners of the properties on that famous hill are talking of consolidating their interests, and if this is done a well-known mining man, formerly a resident here, will assume the management of the property. We trust that this arrangement will be carried out, as it seems that nothing but success could be the

result. There have been many thousands of dollars taken from Massachusetts Hill, and that in the early days when milling was not near as perfect as it is now, and no doubt there are fortunes in that hill yet.

GOOQ QUARTZ.—Herald, Dec. 26: A fine grade of quartz rock has been opened up at the Nevada county mine. Superintendent Fleming showed the writer a piece of quartz to-day that he had just taken from the south drift, that rivals anything of the kind we have seen for some time. The piece was about eight inches by four in size and was very heavy, being filled with high-grade sulphurets—in fact there were more sulphurets than quartz. Free gold was also a noticeable feature, a streak appearing to extend entirely through the specimen. About 450 tons of rock are now on the dump and the company will soon have a mill erected with which to crush the same, being under course of construction now. The stormy weather is somewhat of a drawback to its erection but that difficulty will no doubt soon be overcome, as storms do not last forever. Evidently the owners have a bright prospect ahead, which time will demonstrate. Nothing has yet been realized from this lead but it promises much. When the mine gets to working on a larger scale than at present, numerous men will be employed, thus not only being a source of revenue to the company but will put into general circulation a great deal of money. The Nevada County is bound to be a dividend-payer at no distant day.

A GOOD CLEANUP.—Foothill Tidings, Dec. 24: The wheel mine has just completed a cleanup of 20 loads of ore at Patrick Rogers' mill, and the result is a bar of gold valued at \$1647. This does not include sulphurets. Since the mine has been lately worked there have been, altogether, 80 loads of ore crushed, yielding in the aggregate over \$5000 in gold. The mine is located on Wolf creek, and used to be known as the Granite Hill.

Placer.

IOWA HILL.—Placer Argus, Dec. 24: We are having beautiful weather, but the season so far has not been favorable for mining. The drift claims are worked, and we here occasionally of a rich strike when the nuggets are brought to town. Nearly all the younger men are at work in the claims. A few antiquated old fossils air their grizzled looks around the corner grocery, while they discuss that never failing topic, the weather.

Plumas.

GREEN MOUNTAIN MINE.—Greenville Bulletin, Dec. 26: Work continues with regularity in this mine, and the mill runs steadily. The power drills were started Monday in the face of No. 6 tunnel, which will be driven ahead to the next chute before any stoppage will be made. Mr. Vernam recently made a new survey of the mine for the information of the company. He left for New York last week.

Shasta.

CHURNTOWN CROPPINGS.—Cor. Shasta Democrat, Dec. 23: As placer and quartz mining is the chief industry, more attention is given to that than anything else, and grand idea of all is to uncover as much bedrock in the shortest time possible. There are no laggards here; rain or shine the work goes on, and if we don't make a good showing upon Uncle Sam's balance sheet, as regards the yield of placer gold from this district, the fault does not lie with the workmen. As to quartz, there is nothing doing in the line of prospecting, or developing those claims already located, north of Churntown, but in the Old Diggings everything is booming.

MILL AND MINE.—Shasta Co. Democrat, Dec. 16: More machinery for Iron Mountain arrived Monday. Senator Foster was in town a few days ago looking after his mining interests. The Clark mill is now making successful runs under the skillful management of "Bije" Bemis. Whitton, Bassett & Stocks think they will be able to erect a mill on their Squaw creek mines within 90 days. Yesterday Peter Shearer struck a new tellurium vein on his ground. The quartz shows rich in sylvanite sulphurets. A. P. Minear of Deadwood was up at Squaw creek Thursday and Friday looking at the fine prospects in that camp. S. S. Stickley is preparing to open an assay office at Buckeye. Friend Stickley thoroughly understands the business. Preach Ten Eyke is hauling quartz from Haskell & Co.'s mine on Sick Rock to Merithew & Co.'s mill at Lower Springs. "Bije" Bemis and Tom Harrison intend to put up a custom mill in the Old Diggings district as soon as possible. The machinery has been purchased. Rudolph Seltzer is interested in a fine prospect in the Deadwood district. The vein is about half a mile from the McDonald mine, and the rock prospects first rate in free gold. A new strike was made last week in Weil, Conroy & Murray's mine on Flat creek. A vein of high-grade ore four feet wide was struck in the west end of the lower level, which has greatly elated the owners. Friday Peter Shearer purchased from a couple of Frenchmen a piece of land that he sold them about a year ago. The ground extends from the mouth of Gold Run east about 40 rods, and is thought to be valuable in gold quartz. Peter Shearer has bonded a piece of mining ground on his land to a man by the name of Williams of San Francisco. The ground lays along the railroad track and the vein matter of the claim was exposed by the excavations of the railroad company for roadbed. Ollie Whitton last week sold half of his interest in the Carrie Houston, Lillian Maude and Rose Blossom gold mines on Squaw creek to Col. Stocks, which gives each a fourth interest. Geo. Bassett owning the remaining half. It is their intention now to put a mill on the property as soon as possible. Bell & Co.'s new mill at French Gulch is about ready to be set to work. Hon. Renben Clark is thinking of erecting chlorine works on his mine at Quartz Hill. A carload of sulphurets were shipped from the French Gulch mines a few days ago. Carson has started a tunnel on his mine on Squaw creek. It will tap a rich chute of ore about 100 feet deep. The engine to furnish the power for the Iron Mountain milling machinery arrived last Saturday. It weighs 9000 pounds. Mr. Lowden of French Gulch has been up on Squaw creek for a week past. He thinks the mining prospects there are immense. About 170 men are now employed at Iron Mountain. It is expected that that number will be more than doubled next spring. John Langden and Pehrm are hauling Hart & Day's quartz mill machinery to the mine, and Lee Fader the Iron Mountain machinery, of which there is about 400,000 pounds. It is rumored that Jack Conant has sold the remainder of his claims on Squaw creek to Reilly, Mathews & Co. Parties who came up from San Francisco

Monday say it is so understood there. We learnt that a large company is being formed in Red Bluff that will incorporate and take hold of considerable mining property in the Bullychoop district. Senator Foster is at the head of it. We are told that a few days ago an old prospector struck a very rich quartz ledge in the vicinity of Salt creek, which is similar in character to the tellurium mine. The rock is said to be very rich in free gold. The quartz mill, engine, concentrators and other machinery for Hart, Day & Co., arrived last Thursday night and has been hauled out to the mine. Slowly but surely Old Diggings district is coming to the front. About two weeks ago Sanders & Whitlow sold their mine on Dog creek to a San Francisco company, which, we are informed, has since incorporated with a capital stock of \$300,000. Milling machinery will be erected on the mine early in the spring. Says the Scott Valley News: Tom Minot & Co. have in two years taken out of the river bed upwards of two hundred pounds of gold dust. Tom, after 30 years in the mines has bid farewell to his friends in this section and gone to Texas. The balance of the company intend to work about seven hundred feet more of the Klamath river bend next year, and then steamboats can run from Humburg to Linkville. The dam of the old Townsend Flat ditch at Briggsville was washed out by the recent freshets. This will open the Horsetown Flats to placer miners, and there is said to be considerable good ground in that locality. This dam has been there for 30 years, and has prevented the working of this ground by holding and backing tailings, virtually locking up some of the richest placer ground in northern California. Hon. George C. Perkins and others, who were here last week investigating the Scheerer tellurium mine, have, so we are told, interested themselves with Mr. Robinson for the purpose of erecting milling machinery on said mine—Robinson having an agreement with Mr. Scheerer stipulating that he (Robinson) should erect machinery for reducing the ore for one-fourth of the proceeds. Hart, Day & Co., the new proprietors of the Fleming mines in Old Diggings district, have erected the building for their mill and will have the road from the mill to the mines completed this week. Their machinery, which is expected here tomorrow, consists of five 750-pound stamps, and two Duncan concentrators, a new patent said to be superior to any now in use. The mill is equipped with all the latest improvements and will doubtless be the model concern of the county. As Mr. Hart is a thorough miner and mill man, we may safely look for good results.

Sierra.

RUNNING FULL BLAST.—Tribune, Dec. 20: Antone Demartine informed a Tribune reporter this week that the new mill at the Cleveland mine was running in full blast, and that so far the machinery goes like clockwork. The plates are looking well and it is anticipated that a handsome cleanup will be made on the first of the month. The mine continues to look as flattering as usual.

TUNNEL.—Mountain Messenger, Dec. 26: The Lincoln and Empire Co.'s, of Howland Flat, have entered into an agreement to run a tunnel for the further development of their separate mining claims. Sunday, Dec. 13th, the Ruby Co., Forest City, cleaned up 219 ounces of gold. There are 35 men working, 20 of whom breast gravel.

REO OAK.—Everything progresses favorably at the Red Oak drift mine. By the time spring opens, the company will have the development completed and the property in working order.

EXTENSION.—The cleanup at the Bald Mt. Extension, Forest City, Sunday, was 260 ounces and 18 pennyweights—was nice a lot of bright and pretty coarse gold ever mined in Sierra, reminding old-timers of the days of '49. One nugget weighed 6 ounces and 6 pennyweights. The Rocky Peak and Bunker Hill Mining Co.'s have combined to run a tunnel on their claims, and have let a contract for 200 feet to Adam Walker and Henry Morse. The location of these claims is near Brandy City. The Brandy City Mining Co. has completed over 500 feet of its bedrock tunnel, which is designed to afford an outlet into Canyon creek. A steam drill and 12 men, working three shafts each 24 hours, are doing the work. About three feet a day is made.

Sierraview.

ORO FINO.—Cor. Yreka Union, Dec. 24: Quite a revival has taken place in the past month in quartz interests. The recent soft spell of weather has furnished the miners with an abundance of water to crush their ore, which has given life and vigor to the camp. John Pitz & Co. have crushed 20 tons which have paid \$27 to the ton. Conner & Co. crushed 28 tons which yielded \$24 a ton. Carson & Co. have just cleaned up a crushing of 40 tons with good results—I have not learned the exact amount. Christian Schell, better known as Old Felta, has struck a lode at the head of Taylor Creek, one-half mile west of his cabin, which is the richest find in Oro Fino district. Some say there is \$10,000 in sight. I have not visited the mine yet. The rock is of a greenish cast. The frosty nights are fast closing out the placer mines, there being a scant supply of water for one claim. The Eastlick elevator has proved a grand success. Wright & Fletcher have their pipe and elevator well along and will soon be ready for water.

Tuolumne.

GOLD BRICK.—Tuolumne Independent, Dec. 26: A gold brick, valued at \$1500, was the cleanup of a pocket struck at the Biddle & Whitehouse claim at French camp. Messrs. Stucker & Gale got \$500 out of a pocket on Bald mountain. Messrs. Stevens & O'Hara were also fortunate. The amount we did not learn.

PROSPEROUS OUTLOOK.—Union Democrat, Dec. 26: Miners in this section predict they will have a prosperous time the coming season. Heavy bodies of snow in the mountains warrant a good supply of water which was lacking the last two years. Movements are visible in different directions in the way of preparations for opening and working various mines. On the mother lode near Jamestown there is already considerable activity. The Crystalline is being worked with a full force, and is constantly yielding; the Alabama mill will soon be running; a large quantity of good ore has been opened up and is being placed on the dump for crushing when the mill is ready. The Little Gem mine is at work. The Buchanan mine in the mountains has been running the last 30 days. Active operations are going on at the Hyde mine, and at several other mines work is in progress, or the owners are getting ready.

The outlook now is good, better than for the past two years, imparting high hopes to all engaged in mining. The great number of leads in the county makes this a good field for men with means to prospect. Now that the Constock and other large lodes are exhausted such mining territories as that of Tuolumne will be sought after. If there is not so much gold in these regions as there was in the celebrated mines of other places that have become exhausted, there will be a profit in them for many years to come.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, Dec. 26: On the 3100 level the long diamond drill hole from the face of the main north lateral drift is being steadily followed down north toward the Savage line, the drift being advanced at the very good rate of about 45 feet per week. The end of the drill hole is nearly reached, and the face of the drift is less than 100 feet from the Savage south line. It is to be steadily advanced onward into the Savage mine and through it to the Best and Belcher, the course of the drift being in the direction of that shaft. The material met with in the face of this drift is vein porphyry, with streaks and bunches of good ore occasionally, and no water to trouble. On the 3000 level the upraising in the good ore body above the deep winze station continues, but owing to the lack of hoisting facilities by the Combination shaft being engaged in sinking, no ore is being raised to the surface, but allowed to accumulate on storage in the drifts.

CHOLLAR.—The drain boxes throughout the main lateral drift south on the 3100 level are all in, very effectually carrying off the water which was recently struck at the Potosi line. Further work is necessarily suspended at present, pending the sinking of the Combination shaft 100 feet deeper, or to the 3200 level. Very good progress is being made in sinking this shaft, the material being favorable, and when the 3200 level is reached, the bottom of the shaft should be in the ore vein, or very near to it, allowing for the regular easterly dip or inclination of the vein, gaining toward the vertical course of the shaft. It is calculated that the shaft will be completed to the 3200 level inside of two months. It is now down 40 feet below the 3100 level, and in the course of eight or ten days the plates will be lowered, which will give more room and facility for hoisting waste and ore from the Hale and Norcross, or from the Chollar, if required. The opening made in sinking this mammoth four-compartment shaft is 12 feet wide by 32 feet long, involving the removal and hoisting of a large amount of debris. Good work has been done during the week getting in the drain boxes throughout the entire length of the main lateral drift south on the 3100 level, a distance of 640 feet. The work will be completed in a day or two, the boxes being well covered throughout, in order to not only carry off the hot water but the condensing steam also. The water was struck when the drift reached the north line of the Potosi mine, and we are informed that about tomorrow or next day it is the intention to bulkhead the end or south face of the drift in the most effectual manner possible. This is in order to shut out the flow of water from there, which amounts to several inches and is not wanted. The pumps and everything at the Combination shaft is working finely, and as well as could be desired.

GOULD AND CURRY.—Crosscut No. 2 west on the 1000 level is being steadily advanced in very promising ground, being now about 300 feet in length. At the annual meeting of the stockholders in San Francisco last Monday there was a light change in the control and management, and it was decided to resume explorations at the lower levels and sink the Osbiston shaft of the mine to a corresponding level with the bottom of the Combination shaft and the lower levels of the Chollar, Norcross and Savage mines. The pumps at the Osbiston shaft will be started up after the 1st of January, and the 500 feet in depth of water at the bottom, filling all the drifts and workings of the lower levels, pumped out, after which sinking deeper will be commenced. This shaft is already 2500 feet deep, therefore it will only have 400 or 500 feet deeper to go in order to reach the 3100 or 3200 level of the Combination shaft and its mines connected. The top or surface of the Osbiston shaft is just 171 feet below the top or surface of the Combination shaft. On the 1000 level west crosscut No. 2, 170 feet south of the north line, is now in 288 feet. Face in dry vein porphyry with streaks of clay and quartz.

CON. CALIFORNIA AND VIRGINIA.—The slopes and breasts on the 1750 level still keep up their regular yield of 125 tons per day, assaying \$16 per ton from battery samples at the Morgan mill. The northwest drift on the 1650 level has been advanced 32 feet, making a total length of 357 feet. The Jones lease of the upper levels of this mine, above the 1500 level having been canceled since last week's report, the ground included has reverted back to the company, and the whole is under the efficient direction of Superintendent Patton. The Jones lease section last week, under the closing contract, yielded 1500 tons, assaying \$20.70 per ton from Eureka mill battery samples. On the 1650 level the northwest drift toward the old bonanza workings is now in 317 feet, 34 feet having been made during the week. The ore stopes and breasts on the 1750 continue their regular daily yield of 125 tons per day, as assaying, according to battery samples at the Morgan mill, \$26 per ton, quite an increase over the previous week. The Jones lease section, above the 1500 level is turning out over 200 tons per day, of the average assay value, from Eureka mill battery samples of \$25 per ton. There is a large amount of ore yet in sight, the old stopes and breasts holding out well.

CROWN POINT.—The usual supply of ore about 400 tons per day, continues to be yielded from this mine and the Belcher, principally from the old upper workings, which hold out admirably. Quite a considerable portion of this, however, comes from the 1700 and 1750 levels. The upraise from the 1700 level, to connect with the 1600 level was completed last Monday. This gives a splendid and much needed circulation of air, and greatly facilitates ore extraction and exploration at the lower levels. The old upper levels continue their large regular yield from both this mine and the Belcher. Most of the ore comes from above the 1400 level, but the best in quality is from the 1700 and 1750 levels, the

(Concluded on page 13.)

White Bronze.

For years white bronze has been used in Europe for monuments and statues, but they

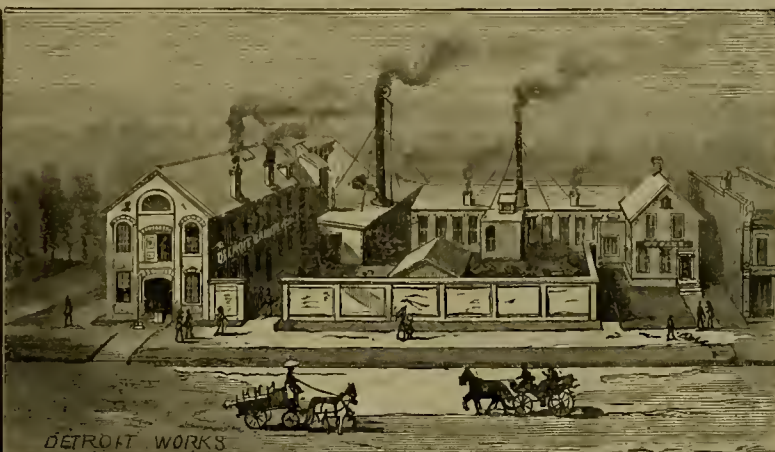
were not admitted, the art foundry was enlarged and a corporation, the Monumental Bronze Company, was formed with \$300,000 capital. In 1881 a western establishment was

ments and statuary ordered in the West; but it soon became evident to the managers that another foundry west of Detroit was a necessity, and in 1884 the Western White Bronze Com-

pany and the work has been sold in every State and Territory in the Union. The material is lasting in its nature, and the facility with which it is moulded into the most artistic de-



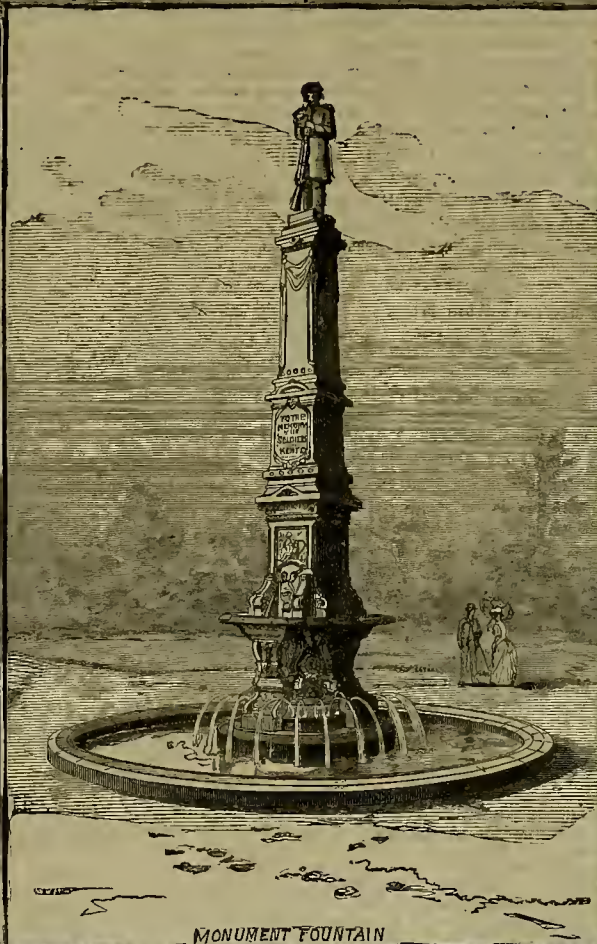
WORKS AT BRIDGEPORT



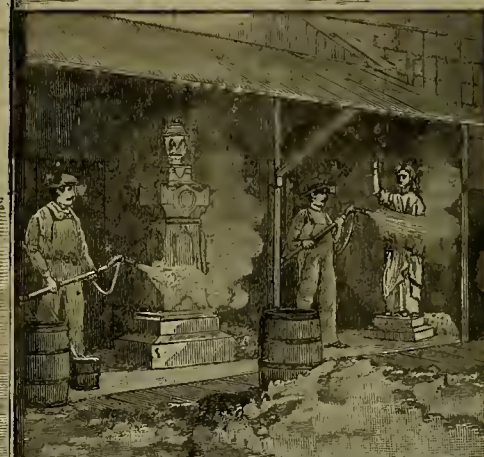
DETROIT WORKS



ARTISTS STUDIO



MONUMENT FOUNTAIN



SANDBLASTING



THE FUSING PROCESS



EXHIBIT AT WORLD'S FAIR



WORKS AT DES MOINES



ST. THOMAS WORKS

ILLUSTRATIONS OF THE WHITE BRONZE MONUMENT INDUSTRY.

were not introduced in this country until 1874. Their intrinsic merit soon began to attract attention, and a year or two later some capitalists established a small art foundry at Bridgeport, Connecticut. The demand for the work increased, more capital was invested, new part-

ners were admitted, the art foundry was enlarged and a corporation, the Monumental Bronze Company, was organized. In 1882 Canada came forward with a claim, and the St. Thomas White Bronze Monument Company was organized at St. Thomas, Ontario. The Detroit Company produced for a short time, the monu-

ments and statuary ordered in the West; but it soon became evident to the managers that another foundry west of Detroit was a necessity, and in 1884 the Western White Bronze Com-

pany was established at Des Moines, Iowa. The highest artistic talent is now employed, and the monuments and statuary produced challenge comparison with the best products of the art foundries of Europe. White bronze agencies are now established in every prominent

city and the work has been sold in every State and Territory in the Union. The material is lasting in its nature, and the facility with which it is moulded into the most artistic de-

signs will ultimately make white bronze more popular for art work than the copper or antique bronze which has heretofore been used so extensively.

The name white bronze was adopted for this perfected and finished material, as an appropri-

ate one to distinguish it from the dark or antique bronze; also, from the cheap statues made of sheet metal. It is claimed by the manufacturers that white bronze, as now made, is so well adapted to monumental purposes that it will ultimately supersede all other materials. Experience has enabled the producers to overcome the many obstacles that at first presented themselves, principal among which was the difficulty of obtaining metal sufficiently purified to retain its color; this has been entirely overcome.

The monuments and statuary are cast as thick, or thicker than copper bronze. The designs are first modeled in clay, and reproduced in plaster of Paris, from which a wax cast is taken, this cast being necessary, in order to procure a perfect metal pattern, from which the monument is molded and cast in the ordinary way.

The illustrations on page 9, which we take from the *Scientific American*, show two important features in the production of this work, one being the fusing and joining together of the different parts by pouring molten metal of the same material as the castings, at a high degree of heat, along the joints; this makes them practically one solid piece, and the corners the strongest part of the work.

The other illustration is that of the application of the sand blast, which gives the surface of the work a pleasing appearance which it always retains, being in this respect superior to copper bronze, which soon after exposure becomes black and unattractive.

The work of finishing and preparing for the sand blast requires a high degree of artistic and mechanical skill; with the exception of the sand blast, all the finishing is hand work, and necessarily expensive.

Metal possesses many advantages over stone for monumental purposes aside from its greater durability; the positive assurance of the raised lettering or inscriptions remaining legible for ages, is itself worthy of appreciation, as the value of any monument lies in its ability to legibly retain its record. The monuments are made with removable tablets, for the purpose of adding inscriptions in the future. White bronze is also free from the discoloring influences of trees or growths of moss or mildew, and is not affected in the least by the elements of the atmosphere so destructive to stone.

It is stated that the granitic obelisk in Paris, which has only been erected there forty years, has so far decayed that the French Government have taken plaster casts of the surface to preserve the inscriptions for historic use; and our own obelisk, which has only been in Central Park for five years, is already disintegrating from the effects of this climate, and scientific men have been called upon to devise means for its preservation, while the old metal and bronze monuments in Europe, that have stood for centuries in the most rigorous climates, are still as perfect as when new.

Monuments and statuary for cemetery purposes are produced of all sizes, styles and designs, competent artists being constantly engaged in modeling original monumental designs, as well as statues, portrait busts, medallions, etc., to be used in connection with granite and bronze monumental work. Our illustration shows the artist's studio at the Bridgeport foundry. Among the recent productions were life-sized busts of Martin Luther, for Allentown, Pa.; Sergeant Major Reynolds, of Brooklyn, N. Y., recently unveiled in Greenwood Cemetery; and statue of Pilot Woolsey, erected in Evergreen Cemetery. A large number of white bronze public monuments have been erected, prominent among them being the one shown on our front page, recently unveiled at Grand Rapids, Mich., which was cast at the Detroit foundry. As a monumental fountain it undoubtedly surpasses all previous productions of this nature that have come to our notice.

We illustrate the different art foundries engaged in the production of white bronze, as well as the exhibit made at the World's Fair, New Orleans, at which the goode were awarded the gold medal; a gold medal was also awarded white bronze at the Southern Exposition, Louisville, Kentucky, last fall, also a medal awarded them at the American Institute Fair, 1884, where a fine display of statuary can now be seen. The work is produced exclusively by the Monumental Bronze Company, Bridgeport, Conn., the Detroit Bronze Company, De-

troit, Mich., the Western White Bronze Company, Des Moines, Ia., the American White Bronze Co., Chicago, Ill., and the St. Thomas White Bronze Monument Co., of St. Thomas, Ont. It is expected that other foundries will soon be established in the West and Southwest.

The time honored custom of using marble and granite for monumental purposes, and the faith that seems to prevail in the enduring qualities of the products of the "everlasting hills," naturally cause a strong opposition to the introduction of metal in this connection, but careful observers have long since noted the shortcomings of marble and granite when exposed for any length of time to atmospheric influences, and they are not content to intrust their family records to such perishable material.

The production of white bronze monuments and statuary, has, until recently, been prosecuted in a quiet, unostentatious way; but with the addition of needed improvements and increased capital, so great has been the development during the past few years, that four foundries are now required to supply the rapidly increasing demand. We are living in the age of telegraphs, telephones, electricity for lights and motive power, and many other useful improvements, all of which have a value in their peculiar uses, and so with the subject of our sketch. The general agent for this coast, Mr. James Linforth, 116 Front St., in this city, will take pleasure in exhibiting to those who wish, various specimens of this white bronze work, and explain more fully to them its peculiarities.

The Sierra Buttes Mine.

EDITORS PRESS:—The Sierra Buttes mine has been in active and continuous operation for 34 years. It was originally discovered by some Mexicans, and has been one of the largest gold producers in the world's history. It is owned by an English company, and the head office is in London, with a branch office in San Francisco. Mr. William Johns is the General Manager of the mines owned by this company. The Sierra Buttes is under the able management of Mr. Thos. Preston, who has been in the employ of the company for about 13 years, and from Mr. Preston's known business abilities, assisted by Capt. Wm. James, of the underground work, and the office staff—Messrs. Briggs and Hopper, together with Mr. Woodward, the millwright, Mr. Maltman, the assayer, and Messrs. Carney, McGregor and Black, millmen, the mine has been brought to its present state of efficiency and successful working.

The mine is located on the southern slope of the Sierra Buttes mountains; the lower works are situated on the North Yuba river. The mine employs at the present time 250 men, which is the average all the year round. The mine is worked by a series of tunnels or levels, from Nos. 1 to 9, but only, 6, 7, 8 and 9 are at present operating. The lowest of these, No. 9, has been run 6400 feet, and up to the present time not a pound of ore has been extracted from it. For over 3000 feet this tunnel has been run on the course of the vein, which has varied from 6 to 15 feet in width, all of which has been of too low a grade to be profitably worked. A raise is now being put up to the 8th level, which, when completed, will be about 750 feet. The 8th level is the level from which the ore is now extracted which supplies this mill. The average yield of ore that was extracted last month was \$5.50 per ton; the cost of mining and milling, \$3.98. It is a 60-stamp mill, which is kept constantly running. It is run by water power; three wheels are used for driving the machinery. There are 24 Frue concentrators for concentrating the sulphurets. The sulphurets are afterwards reduced by means of a reverberatory furnace. After roasting, they undergo the process of chlorination. The chlorination works have only recently been erected, and are now in successful operation. They are the most complete and compact in the State, and contain all the latest improvements.

The company board their men in two commodious boarding houses. These boarding houses are remarkable for their cleanliness, and the good order which prevails. The spacious drying-rooms for the miners to change their clothing after coming from the mines, is duly appreciated, as also the reading-room, which the company has not lost sight of. Mr. Preston has kindly invited your correspondent to partake of a dinner, that was awaiting the miners as they came from their work, and I must say that the soup, good fresh beef, and the heat of vegetables, pudding, pastry, etc., was such as the most critical could desire.

The company are entitled to credit for the general interest they take in their employees, welfare, as nothing seems wanting to make them comfortable. In case of any accident, they are placed on half pay, and all men have medical attendance, which is very efficiently and satisfactorily supplied by Dr. W. O. Buckland, who is remarkable for his attention and

courtesy, and consequently extremely popular with the men. There is a brass band, consisting of 16 performers, which enliven the camp by playing selections three times a week, which the employees seem much to appreciate. *Sierra City, Sierra Co.* M. L. D.

Condensing Flue Dust.

Use of Electricity for the Condensation of Metallic Fumes.

(Translated from the GERMAN for MINING AND SCIENTIFIC PRESS by CHARLES A. SCHENCK.)

A new and most interesting process for the condensation of metallic fumes has recently been made public in England by Mr. Alfred O. Walker, a process which appears to be especially adapted to the working of lead ores, but which may also be successfully employed in other metallurgical works.

Prof. C. I. Lodge delivered, at Liverpool a few months ago, a very instructive lecture on "Dust," in which he took pains to describe the very remarkable effect produced by electricity on the dust floating in air, a phenomenon first studied by him.

Metallic magnesium, when burned under a bell-glass, fills the enclosed space with a thick white smoke of magnesia, which, under ordinary circumstances, settles only after a long while. Introduce, now, into the bell glass a metallic wire, for instance a copper wire, which with one end is attached to one pole of an electric machine, and at the other end terminates under the bell-glass with one or more needle-shaped points; connect the other pole of the machine with the earth and a very decided effect will be produced as soon as the machine is set in motion. The white and dense fog commences to move at once, rapidly rolling about in vortex-like curves, especially near the needle-shaped points; fine particles, first approaching one another, combine, and the fog, being changed into flakes, resembles fine snow, which settles quickly, especially on the sides of the bell-glass. After a few seconds the suspended smoke has entirely disappeared.

Similar experiments can be made with other substances, for instance, with the thick smoke from burning tar, and even with the smoke from paper which is quite light. The same phenomena are produced every time; the particles of smoke and dust may be as fine as their nature permits, and under ordinary circumstances not inclined to settle at all, they accumulate and settle at once under the effect of the electric current, flowing out of the metallic points.

All this was discussed by Professor Lodge in his lecture and clearly proved by experiments. This lecture was afterwards published in *Nature*, by which means Mr. Alfred O. Walker first heard of it. This gentleman is a member of the well-known firm of Walker, Parker & Co., the largest manufacturers of lead and lead products in England and owners of several extensive establishments—and he perceived at once that the discoveries of the Professor might be utilized for a profitable condensation of the fumes of lead, the so-called "flue dust." He informed Professor Lodge of his plans and, after some consultation with him, commenced a series of new experiments at the Dee Bank Lead Works, near Baglit, in Flintshire, with the assistance of the superintendent, Mr. W. M. Hutchings, and the scientific aid of Professor Lodge.

These experiments were continued during several months and, to the satisfaction of all concerned, it was clearly shown that the fumes in the flues of a furnace are acted upon by electricity in the same energetic manner as the magnesia smoke under a bell-glass.

In these experiments Mr. Walker did not make direct use of the main flue, as it would have been nearly impossible to make observations in the darkened canal. He made an opening in one of its sides, at a point not far from the furnace, which opening communicated directly with a longitudinal wooden box, provided with windows for the purpose of watching the work. By means of a slide in the main flue, a variable amount of smoke could be led into the box, and through it into the air. By pushing down this slide to the bottom of the main flue, the entire pressure of smoke from a long row of furnaces might be likewise forced through the box, by which means a very strong and rapid current of fumes and gases was obtained for observation. The exterior end of the box was also provided with a sliding door to shut in the smoke *ad libitum* after it had been filled, so that the smoke enclosed in this camera could be observed with ease, when it had come to rest.

The electric machine, used in the experiments, generated electricity by induction, and was built after the system of Voss; its rotating plate of glass had a diameter of 18 inches; it was put up in a small room next the wooden flue. An insulated copper wire communicated with the upper end of a conductor, which was fastened to the cover of the wooden flue, so that it reached about half way between its top and bottom. This conductor was made of copper one-fourth of an inch in thickness, and enclosed in a three-fourth inch tube of glass, to prevent the smoke, as much as possible, from coming in contact with it; it was suspended between two opposite windows. At its lower end, where it issued out of the glass tube, differently

constructed systems of metallic points could be attached for the flow of the electric current. Copper bars, straight, or in the form of a cross or bent into rings, provided with needle-like points, were alternatively used in these experiments.

After the correction of some small mistakes, in regard to the insulation of the wire and the conductor suspended in the canal, the experiments gave entire satisfaction.

This wooden canal being filled with smoke, the two sliding doors at the entrance and exit were pushed down at the same time and the machine was set in motion. The plumbiferous fog, exhibiting a vigorous vortex-like motion, was at once changed into snow and the inside of the box cleared up in a very short time. But the effect of the electricity was not less surprising if the smoke was made to flow through it with full velocity, passing out into air. At its exit this dust changed completely, forming accumulations of a flaky nature, which in a quiet air settled rapidly on the ground. Suddenly interrupting the current of smoke and looking from the exit into the box, it could again be seen that the smoke, after passing the metallic points, settled quickly, in a trifling distance from the conductor and consisting almost entirely of flakes.

In short, it was completely proven that the effect of electricity on smoke or dust in a wooden flue, whether it be at rest or moving on with the full draft of the chimney, and under all possible degrees of heat, proportions of steam and acid, is decidedly the same as it is under a bell-glass on the table of the laboratory.

Two things only have to be looked at to insure complete success: 1, wire and conductor down to the middle of the canal must be well insulated and 2, a sufficient number of metallic points must be uniformly distributed over the lateral canal section. Points as well as the bars to which they are fastened get thickly covered with the condensed dust; but this does not appear to produce any detrimental effect in the working of the machines. It may, perhaps, do so after long use, and in such a case the remedy readily suggests itself. The manner of connecting the bars, provided with the needle-shaped points, with the lower end of the conductor must be such that they may be easily taken out and brushed off.

Walker, Parker & Co. have now decided to introduce this process on a large scale in their establishments. Two large electric machines are being constructed, which will need a motor of one-horse power. They will be built after the system of Wimshurst, generating electricity by induction, with rotating plates of glass 5 feet in diameter. The Wimshurst machine is almost entirely independent of the hygrometric state of the atmosphere, and at the same time so simple in all its parts, that it is well adapted for effective and constant work. In the working plan on a large scale the smoke in the main flue passes in succession two or perhaps three rows of metallic points, having a distance of a few metres between them. By such an arrangement the strong effect of the electricity flowing from the first row is supported, continued and finished by the following, so that the flaky accumulations of smoke and dust must quickly settle.

Mr. Walker has taken out patents for England and other countries which, besides the condensation of lead, cover all other metallurgical vapors as zinc, oxide of zinc, mercury, etc.

That this new and simple way of condensing the smoke of furnaces will very soon be adopted by all lead works of any importance cannot be doubted. The cost of the plant is only a small one, and no interruption in the routine work of the furnace need be anticipated from its employment.

All other proposed mechanical contrivances for condensing the furnace dust have so far been of little practical value on account of the heavy outlay for the plant, and the heavy running expenses; and also on account of the irregularities and frequent interruptions which are caused by them in the draft. Long flues and systems of flue-chambers are also very expensive, and considering the necessity of a good draft, can only be employed to a limited extent, so that the loss of metal from escaping fumes, even in the best case, must still be considerable. Enormous sums are lost every year in the form of lead fumes, and in the best constructed establishments, with extensive flues and flue-chambers.

Considering on the other hand, Mr. Walker's new way, even a short flue will do good work, because the electrified and flaky dust will settle very soon, and cannot be carried away for any great distance.

The outlay for the whole plant, even for the largest establishment, will be a small one, consisting of two electric machines with conductors and wires, and a motor of about one-horse power.

We owe it to the sagacity and practical insight of Mr. Alfred Walker, that the very interesting experiments of Professor Lodge, have so soon found application in the metallurgical industry, and a striking proof has thereby been rendered again of the many and sometimes quite unexpected directions, in which the studies and experiments of "pure science" can be made useful in practical life.

VESEVIVUS, according to dispatches of Nov. 16, is again in a state of eruption. The lava at that date was streaming down the west side of the mountain, and some alarm was felt that a more serious display of activity might be made.

A Miner's Views on the Silver Question.

EDITORS PRESS:—The following ideas were suggested to me after reading that part of the President's message relating to silver coinage: If the Government of the United States would positively (by enactment) say that 412½ grains of silver shall have a value of 100 cents when coined and stamped, by the proper authority of the Government, and make it a legal tender, for all dues, public and private, we may coin \$100,000,000 annually; and I would defy the combination of all our bankers and money shavers of this country, and the combination of the same class that is now controlling the Government of Europe, to affect or depreciate our silver dollar, and thereby affect the working and producing classes of this country.

If European bankers and money shavers want our gold, how are they going to get it without giving us an equivalent for it? We are not dependent upon foreign Governments or our bankers for our gold and silver. We are dependent upon our miners for it; and for the gold and silver we get from foreign countries, we are dependent upon our own mechanics and producers.

The production, under this Government, of the toiling millions, is the wealth of this great country.

Our President, in his recent message, seems to have ignored this class entirely, and taken up with the interest of the banker and financier, as the important factors of this Government. They have taken the position of figurehead to the ship, and claim that they have brought the ship, with her valuable cargo, into port. Our President is like the boy who thought the figurehead brought the ship into port.

It requires but a very superficial examination of this gold and silver question to see that the issue is between the toiling millions of producers and mechanics that are making this country one of the richest in the world, and our bankers, and money shavers and politicians in their employ.

It is time that our President and Representatives should know that the millions of producers and mechanics are the operating power that is producing the wealth of this country. Out of this element came the cabin, the farm, the mine, the village, the city. All the complicated machinery, the suspension bridges, telegraph lines, the great railroads, all the complicated appliances that give comfort to modern civilization, came from the skilled labor of the producer and mechanic. Out of this element came the soldier that made up our great armies. For almost five sad years did they battle for our country, in rain and storm, summer and winter, without shelter—laid down their lives by the thousands, until the aggregate was hundreds of thousands. The wailing of the father, mother, widow and orphans could be heard throughout the land.

For the rank and file, these men were paid \$16 per month, and that in greenbacks. They took it in good faith. Now, excuse the digression, but what did the bankers do? The record shows they depreciated this hard-earned currency as low as 70 per cent below its face value, and made it a means of speculation by which they made millions (of profits) off of the needs of the soldier, widow and orphans. The nation is ashamed to read this record, and yet these bankers have the impudence to tamper with our President and Representatives, and ask them to legislate for their exclusive benefit by stopping the coinage of our silver dollar, and have no standard value for it, thereby giving the banker a chance to manipulate its value at their option. This is a terrible thing to contemplate—that our silver coin shall be subject to depreciation 15 or 20 per cent, at the option of a few bankers. Say we have about \$220,000,000 coined; a depreciation of 15 per cent means a loss of \$33,000,000.

Do our President and Representatives ask the people to allow this? It is time they should know that the people demand a stop put to speculation on our Government money. And it is time for them to know that the people demand that all Government dues be paid in coin, as per agreement, and such as is received by the Government Treasury. It is time for them to know that the people demand a payment of all interest-bearing debts of the Government, if it takes the last dollar in the United States Treasury.

The cause of our Government locking up hundreds of millions of dollars, comes from the manipulating of our Representatives by the bankers. It is a very strange thing that our Representatives will lock up hundreds of millions of dollars, and then ask the people to pay interest on it. I say pay these bankers off as long as there is a gold or silver dollar in the United States Treasury.

And then start up all the mints to coining, if it is \$100,000,000 annually. Make silver legal tender for all dues, public and private. To the miner give silver and gold certificates for his haul; coin it all and pay the Government debts with it. The miners will take their certificates very willingly and not charge any interest for so doing. Where is the difference in the convenience of having a thousand dollars in silver certificates, and having a thousand dollars in gold certificates? If our Government wants to pay any foreign debt that she may owe, the producers and mechanics of this country can let her have \$1,000,000,000 worth of merchandise annually that foreign countries

must have to sustain the comforts of life, and willingly take it, the pay, in silver certificates. If any crank wants gold certificates let him have them, or coin. All we want to know is that no man, or association of men, dare to depreciate the coin of this Government. I say not reduce the taxes until all interest-bearing debts of the Government are paid in coin. It is time that our financial sharpers and bankers, with their political tricksters, to know that we can spare them and all the gold they own with less loss than any other item that can be named. Suppose we banish these gold kings to some lone island in the Pacific Ocean. When they got real hungry Uncle Sam would send them a ship loaded with potatoes, stamped, worth \$20 in gold apiece. Would they refuse to take that kind of coin? I guess not. Their eyes would be opened for the first time, to the fact that the wealth of a country is its productions of food and clothing, with skilled appliances for obtaining it. This is the condition of Europe. They are dependent upon this country for a large portion of the necessities of civilized life. We are the most important member of the civilized portion of the world. As the years roll by, our importance will increase. No nation will be independent of the want of some of our merchandise. Our Government coin will command its face valuation in any part of the earth, let it be gold or silver, or certificates of gold or silver.

It is time for our representatives to know that this is to be our condition in the near future. Give us a standard gold and silver coin, lock up no coin; pay all Government indebtedness in coin; stop legislating for bankers exclusively; encourage mining; coin the hullion as fast as it is produced; encourage the manufacturing, the mechanic and the producer; cover the ocean with merchant ships and a navy to protect them. Stop all deception and fraud in all departments of the Government and the people will make this the richest country the world ever saw.

MINER.

Testing and Working Silver Ores

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

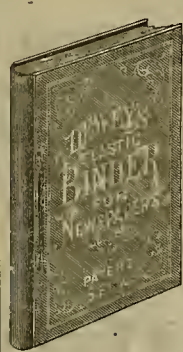
Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation; test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protodichloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patehen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Krichak's process, etc. Under "Pulverizing Machines" are described the Austria and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

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About Obtaining Patents.

Patents are Virtually Contracts

Between inventors and the public. The consideration flowing from both parties to the contract is expressly fixed by statute. The Government requires the following consideration in every case: First, that an applicant for a patent shall disclose a new and useful improvement, of which he is the first and original inventor. Second, that the invention has not been patented, or published in a printed publication prior to the date of his invention. Third, that the invention has not been in public use, or on sale, more than two years prior to his application for a patent. Fourth, that the invention shall be properly described and claimed in the specification forming a part of the patent. Provided an inventor complies strictly with these conditions, the Government guarantees that the inventor shall have the exclusive right to make, use and sell the thing invented for the term of seventeen years.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. This question can often be answered gratuitously by us, immediately on receiving full information of the invention, by reason of our long and extensive practice as patent solicitors and editors and publishers of first-class, scientific and industrial journals, during the past 20 years and over. When the question of priority of invention is not so readily to be determined, it is generally best to make what is termed a "preliminary examination," by searching through the patent office reports among the patents in the class to which the invention relates, and referring to our extensive patent library, containing compilations of special classes of American and foreign inventions, mechanical dictionaries, scientific encyclopedias, files of scientific and mechanical newspapers, and an immense number of patent applications by inventors of the Pacific coast, carefully filed by this office since 1860.

If, by this "preliminary examination," the improvement is found to have been previously invented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely whereby his invention has been anticipated, thereby saving him further expense and perhaps much time, useless delay, anxiety, etc.

To avoid all unnecessary delay, however, in securing patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately, and forwarded to the inventor for his signature. When the inventor receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps to be taken.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$30 to us, we will order the issue of the patent, and forward this same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretence of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give a case up as long as there is a chance to obtain a patent. The agency charge is from \$25 to \$30, or sometimes more, if the invention is intricate or complicated, or requires much labor. Drawings cost from \$5 upward, according to their number and the time employed, and, if a model is sent, the express charges upon this and the papers must be added. The total cost, in addition to Government fees, rarely exceeds \$40, and for this we do all we can without appealing the case.

When the invention consists of a new article of manufacture, or a new composition, samples of the separate ingredients sufficient to make the experiment, and also of the manufactured article itself, must be furnished.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are considered more satisfactory to the Patent Office than the old and more cumbersome system of storing up an immense bulk of almost numberless models.

Drawings or sketches, sufficient to illustrate clearly the invention, with an efficient description to enable us to make a full set of perfect drawings for the Patent Office is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it for us.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or very poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention while in reality it may be of great value, and would meet with ready sale had the invention been fully portrayed by artistic and skillfully executed drawings. Again, when patents of this character are brought into court, the uncertainty and ambiguity of the drawings enable the opposing experts to mystify the judges as to the construction or combination of parts intended to be covered by the patents. In all cases prepared by us, the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken that the invention is fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

In the Patent Office

The application is assigned to the Examiner having charge of the class to which the invention relates. The case must then take its turn with others in the order of filing, and in due time is carefully examined to test the novelty of the in-

vention. If the examiner fails to find anything that anticipates the invention, a patent is immediately allowed, provided the specification and claims are drafted in proper form. Should the Examiner find a prior patent which, in his opinion, anticipates one or more of the claims in the application, a letter of rejection is sent to the attorney in charge of the case; and, if the attorney coincides with the views of the Examiner, the claims rejected are erased. In preparing applications for patents, an attorney should be careful to familiarize himself with the class of inventions to which the application pertains, so that the specification and claims may be drafted as nearly perfect in the first instance as is possible. This course saves much time in prosecuting the application to a patent.

When claims are improperly rejected on patents which do not anticipate the spirit or wording of the claims, proper steps are immediately taken to convince the Examiner of his error. This is done, in most part, by personal arguments, as the differences in construction, operation, function and results are more readily discovered and appreciated by an oral presentation of the facts than can possibly be done by relying solely on written arguments. In order that the Patent Office record of the patents shall be complete, an oral argument is generally supplemented by a manuscript brief, that others, in examining the files at any future time, may clearly comprehend the position taken by the Examiner and attorney in prosecuting the case to a patent.

In addition to our own personal attention to the interest of our clients here, we have, for over 12 years past, had constantly in association with us in Washington, one of the soundest legal counselors and ablest practitioners in patent business in this country, who carefully attends in person to our business at the Patent Office, and has attained success in a most marked degree.

Perfect Claims.

The value and force of a patent are dependent on its claims. A patent may disclose to the public the most important and valuable invention, and yet the claim be of such meager scope that the patent is actually worthless. When the claims of a patent are so loosely drafted that infringers can flood the market with improvements, differing from the improvement disclosed by the patent only in slight changes in construction and arrangements of parts, such a patent is valueless to the owner, as it fails to afford him that exclusive and complete protection guaranteed by the Patent Law. Hence it is that the greatest care, skill and perseverance are required, first, in properly drafting the claims in the first instance, and second, in prosecuting the application before the Patent Office, and maintaining the rights of the inventor to claims as broad and sweeping as the invention will warrant. This latter is no easy task. The Examiners of the Patent Office serve in the capacity of attorneys guarding the interests of the public. It is their sworn duty to exercise the greatest care and watchfulness, that patents do not secure claims of greater scope than they are justly entitled to. It is but natural that Examiners are sometimes in error as to just what scope should be accorded an invention. Although the Examiners act under honest convictions in cases where they refuse an inventor his just rights, yet it is the duty of the attorney to maintain the claims of his client, if he is convinced that they are just and proper. To succeed in this requires the display of tact, firmness and shrewdness; and when the Examiner is made to see that the inventor is honestly and fairly entitled to the claims which have been rejected, he will almost invariably recede from his former action, and allow the case.

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The firm of DEWEY & CO. (continuously editors and publishers of the MINING AND SCIENTIFIC PRESS, nearly from its early commencement in 1860) offer comparatively far better facilities to the local inventors of the Pacific States and Territories than are possessed by any other agents in America. Members of the firm give personal attention to the applications entrusted to their care. They have been longer in practice in patent soliciting than most agents who are still personally engaged in the business. They have secured more U. S. and foreign patents in the past 20 years (with very few exceptions) than any other firm still existing. Their practice has been so successful and long continued, that the great majority of inventions on this side of the American continent have been patented through their agency, thus affording them great and valuable experience, by thorough information of the true principles and points of novelty in the inventions, whether general in character or peculiarly local to this coast.

The extensive business combination and experience of this firm is undoubtedly one of the most fortunate in existence for affording inventors prompt and reliable advice, and the best possible facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation that is best calculated to widely inform the class of readers most specially interested in the subject of his invention.

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Inventors on this coast will find that owing to our familiarity with inventions and local affairs of this coast, we can more readily and fully comprehend their wants, and thus save much of the time ordinarily consumed in preliminary writing back and forth when distant agencies are employed.

Caveats.

A caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the inventor to receive notice, for a period of one year, of any application for a patent subsequently filed, and which is adjudged to be novel, and is likely to interfere with the invention described in the caveat, and the inventor is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from \$10 to \$20. The Government fee is \$10 additional.

To enable us to prepare caveat papers, we only require a sketch and description of the invention.

Rejected Applications.

Inventors who have rejected cases (prepared either by themselves, or for them by other agents), who desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

Inventors who do business with us will be notified of the state of their application in the Patent Office, when it is possible for us to do so.

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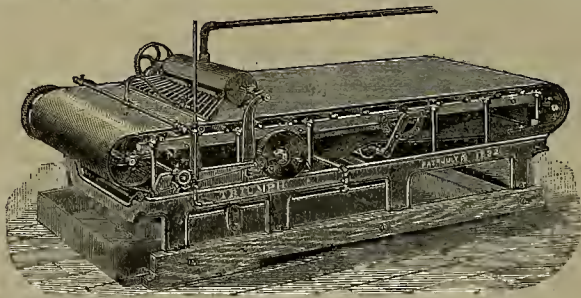
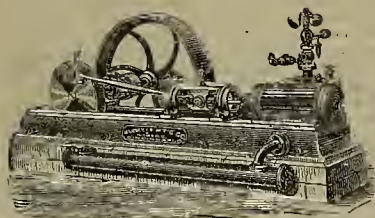
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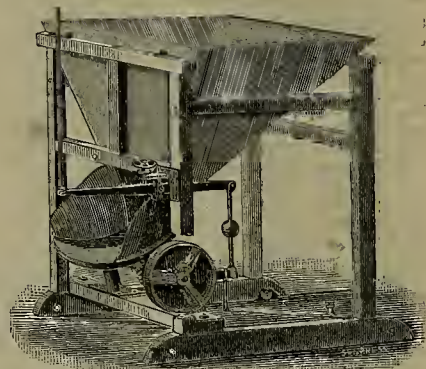
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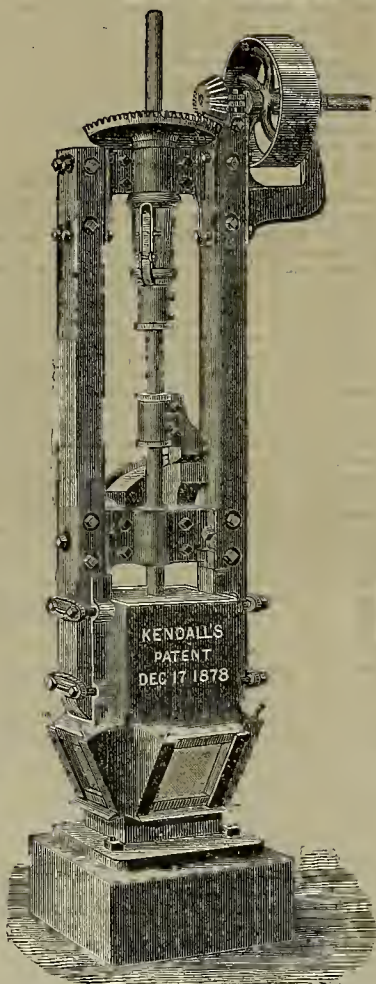
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Mining Summary.

(Continued from page 8.)

latter depth being within a few feet of the surface of the great flood of water, which has submerged the lowest levels for three or four years past.

ORISK.—On the 400 level the drift running south from the main west drift has been advanced 42 feet; total, 342 feet. The crosscut east from this main south drift is now in 117 feet, 24 having been added during the week. On the 700 level, the station at the main shaft is being put in thorough repair, with a view to running a drift in a northwesterly direction in Mexican and Union ground, for ore exploration purposes. On the 400 level the main south drift has been extended thirty-seven feet, making a total length of 298 feet. The crosscut west from this drift is in 135 feet, and the crosscut east is in about 100 feet. Nothing of value has as yet been developed on this level.

PINE CREEK.—Cor. Bedrock Democrat, Dec. 7: The Oregon Gold and Silver Mining Co., of Louisville, Ky., are working quite a force of men. I am told it is the intention to work twenty-five men on the Whitman mine this winter. The assessment work has been completed on all the principal mines for this year, and several of them have from five hundred to one thousand dollars' worth of work done. When spring opens, the capitalists can come in and see as fine a lot of mines as to be seen in the country. It has finally leaked out about these claims the Leap Bros. found some twenty-five miles from here in a northeast direction. I saw some of the ore that came from there last summer, but was misinformed where they got it. It is very rich and said to be extensive. There is no doubt that there will be a rush here in the spring. If we don't have a mining boom next summer, it won't be because the mineral is not here.

ALTA.—Explorations on the 700 level continue, and a drift is being run north toward the Benton ground. Some few bunches and streaks of good ore are met with, but no strong and extensive concentration. On the 700 level, the lateral drift north, toward the Benton ground, is making good progress in procuring vein material, with streaks and bunches of low-grade ore.

YELLOW JACKET.—Sufficient ore continues to be extracted to keep the Brunswick mill steadily running. This is all from the upper workings, above the 1300. Nothing new in the way of ore is developed by the exploring drift north on the 1700 level. About 175 tons continue to be the regular daily yield from the old workings, above the 1300 level, keeping the Brunswick mill steadily running. Nothing new in the way of ore developments yet discovered by the lateral drift north, being run on the 1700 level from the Crown Point mine through the Kentucky. Quite a heavy draft of miners was made the first of the present week, owing to the over-supply of ore and improved openings and facilities for extraction.

MEXICAN.—On the 500 level, the north lateral drift from the east crosscut has been advanced 37 feet, making a total length of 247 feet. No change in the material. The west crosscut has been extended 47 feet; total, 210 feet. On the 600 level the lateral drift, north from the east crosscut, is 210 ft., and the lateral drift south, opposite to it, 180 feet. Both are simply running in favorable vein matter. The west crosscut from the main north lateral drift is being extended and is now in 143 feet.

SIERRA NEVADA.—On the 500 level, the main north lateral drift has been advanced 50 feet, making a total length of 1356 feet. Face in the same favorable material as last week, soft vein porphyry, clay and quartz. The main north lateral drift has been extended during the week 72 feet, making a total length of 1306 feet. The material encountered continues to be soft vein porphyry, clay and quartz. Seven or eight tons per day of gold-bearing ore are taken from the surface croppings of the mine and shipped to mill.

UNION CONSOLIDATED.—On the 500 level the crosscut east, 100 feet south of the Sierra Nevada line has been advanced 36 feet; total, 401 feet. Material, vein porphyry, quartz and clay.

KENTUCKY.—The usual yield of ore comes from the old upper workings, sufficient to keep the mills running.

MONTE CRISTO.—A few tons of ore per day are extracted, enough to supply the mill.

BEST AND BELCHER.—On the 1000 level west crosscut No. 3 is in 336 feet. The diamond drill, which has been run ahead from the face of this crosscut, tapped quite a flow of water last Tuesday, and has been withdrawn.

Columbus District.

MOUNT DIABLO.—True fissure, Dec. 26: The winze from the east drift on the 4th level is down 135 feet. This is as low as the 5th level and we have stopped sinking the winze and started an intermediate drift on a small streak of 570 ore 64 feet below the 4th level. The east drift from the north crosscut on the 4th level is in 43 feet and the face shows 8 inches of 550 ore. The east intermediate from the No. 7 winze is in 161 feet and shows a small streak of ore in the face.

GREAT EASTERN.—J. H. Grafton arrived last Friday evening to take charge of the Great Eastern, formerly the Schiller. It is owned by W. H. Elliott, P. Manning and T. J. Harrington. Work will be resumed shortly.

O. K.—Two men are working on the incline following the ledge. They are down 13 feet. There are 8 inches of \$300 ore.

MOUNTAIN BOY.—Sinking the shaft. Now down about 90 feet. It is the intention to sink 10 feet further and then begin drifting. Have struck a few bunches of ore on the hanging.

Central District.

PROSPECTORS AT WORK.—Silver State, Dec. 23: S. W. Hammond was up from Central District yesterday. He says there are several prospectors at work in the district. M. S. Thompson has a fine body of ore at a depth of 275 feet in the Marietta mine. Charley Wright, Bob Calhoun and Charles Winn, are working on the Empire, a gold-bearing lead, recently discovered. They have sunk twenty feet on the vein, which looks well. J. F. Clark has shipped a carload of argentineous galena ore from the Locomotive to Salt Lake, and is prosecuting work on the mine. Mr. Clark is also making arrangements to resume work on the Railroad mine.

The low price of silver, Mr. Hammond says, is very discouraging to miners, and if silver coinage should be suspended and the price of bullion be further reduced they will have to quit.

Hawthorne District.

THE KINKADEE MILL.—Walker Lake Bulletin, Dec. 26: The Kinkadee mill is doing excellent work with its stamps and concentrator. It may be said that everything in the rock is saved and probably no tailings on the coast have as little assay value. Three men are now at work sinking the well deeper and running more drifts for an increase of water in preparation for the large quantities of ore which are now awaiting reduction. The stamps will probably have but few idle moments for a long time.

THE DICTATOR.—As work in the Dictator progresses the appearance of the mine improves, and it will not be at all surprising to those who have seen it, if it develops into one of the highest and best mines in this section. The ore in the ledge is getting better; a general sample which was sent to Carson for assay last week, gave very high returns, and as there is plenty of this kind of rock, the mills in this neighborhood will be kept busy.

THE RED BANK.—Work on the Red Bank will soon be begun. The ledge shows some of the richest rock in Hawthorne district, and everybody expects a great mine.

Lone Mountain District.

AN IMPORTANT SALE.—Elko Free Press, Dec. 18: The prospects of a lively mining camp at Lone Mountain next spring are very bright, an interest in the King mine of that place having been purchased by Mr. Edward Reilly, the extensive and successful mining operator, who is interested in mines in California, Arizona and other points on the Pacific coast, besides controlling operations in Bullion district, in this county the price paid for an interest in the King mine was \$10,000 in cash, and the putting up of a mill on Lone Mountain creek, the mill to be erected early in the coming spring. The sale is an important one in many ways, as it will be the means of putting new life into the Lone Mountain district, which has many other excellent mining properties. After closing the bargain with Mr. Weston, Mr. Reilly started for New York. On his return in the spring, work will at once be commenced on the King mine and mill. In Lone Mountain district there are many copper-silver mines which will be affected by the sale, as they will now be more extensively worked. We understand that parties are now looking into the matter of purchasing one or two of these copper-silver properties, and it is fair to presume that several others will be made next spring. The mill to be erected will be one of the new pattern for the reduction of free milling ores, and will be first-class in every particular. There is every prospect that Lone Mountain will come to the front in the near future. With a mill at Lone Mountain and reduction works at Elko, good times will come again.

ARIZONA.

IMPROVEMENTS.—Clifton Clarion, Dec. 23: The Arizona Copper Co. have decided to replace the old corrugated iron roof over the smelter with a new roof of slate. The sulphur from the furnaces formed an acid which destroyed the iron on the old roof. The pumps and blowers will be securely boxed up. The company are trying a new dust eater with much promise of success. The concentrating jig, with which experiments have been tried, has given satisfaction so far and it is probable that unless some untoward event occurs before long the jig will be introduced in a large scale on the works. A plunger with the proper length of stroke forces water up through a sieve. The ore containing copper, being of a greater specific gravity than the rock with no copper, falls to the bottom. The lighter portion is drained off in one sluice and the heavier (the copper) in another. By this process it is believed the output of the works can be doubled without serious increase of cost. The ore will pass through two crushers in succession and a series of revolving disks and will be received, according to its size, in probably six different concentrators. It would be impossible to pass through these works without being struck at once with the completeness of the plant and the nice and economic adaptation of means to specific ends.

COLORADO.

CRYSTAL CITY.—Elk Mt. Pilot, Dec. 26: The Black Queen is only working a small force of men for the winter, but the ore body is fully as good as it ever was, and will help to induce a smelting plant being erected on Rock Creek. The Belle of Titusville is showing up finely, and the boys expect to have considerable 100-oz. ore to ship next spring. They are making good progress and have a quantity of ore on the dump. George Hale is working the Good Enough on Sheep mountain, and is opening up a splendid body of galena ore. Cline and Turner will commence work upon the Hudson at once. They have a fine showing in the vein, and it is one of the properties that will come to the front. A sale of a 1/4 interest in the Tabor and Change claims upon White mountain, has recently been made, and they will be worked extensively next season, which will add to the attraction of that mountain. Traveling is good up Rock creek to Crystal and the boys of this section are all at work. The divide is closed for the winter, and we may say we are a world within ourselves for a short period, having laid in a stock of provisions for the winter. Development work goes steadily on among our mines and in our coal fields, which will bring out our camp as one of the best in the State. The Crown Point lode, on Covode mountain, owned by Hannigan and Santo, is a parallel vein to the Big Chief lode. The developments show one shaft which has been sunk to a depth of 25 feet. The crevice between the walls is about four feet thick. A vein of ore is apparent about two and a half inches in thickness, which shows yellow copper and green carbonates of copper, and assays 3-10 gold, 19 silver and 2 1/2 per cent copper to the ton.

IDAHO.

KETCHUM NOTES.—Keystone, Dec. 22: Billy Turner has struck ore above the Harris lode on Elkhorn Hill. The Philadelphia smelters closed temporarily a few days since, but will blow in again in a day or two. The managers of the Lion mine at Vienna put thirty men to work this week and have made arrangements to have their ore reduced by the

Vienna mill. The Wiswell mill on the Donovan group of mines has been running a week and proves to be a success. A partial cleanup was made after the first twenty-four hours' run, which was quite satisfactory. The Higginbottom claim at Muldoon recently shipped 1630 pounds of ore that went 991 ounces. A tunnel is being run to tip the ledge at a depth of 175 feet. The ore vein is small, but exceedingly high grade and the ledge and formation are good. The Minnie Moore mine at Bellevue is badly in debt and in the hands of the first mortgagees, who promise to square matters up. A beautiful body of gray copper and native silver ore was struck in the 1150-foot drift of the Ramsborn mine at Byhorse on the 11th instant, showing a continuous vein from the surface to that great depth. A fine specimen as large as a man's fist, and valued at several dollars, was received by Geo. M. Snow and is exhibited at the First National Bank. The Vienna mill is at present closed down, but will start up in a few days. A good strike—10 inches of ore—is reported in the Eagle Rock mine at Challis. The Wiswell mill at the Donovan group on Camas has started up and is said to run excellently. Six inches of fine galena ore is reported as having been struck in the Independence mine last week. There are about 200 men at work in Broadford and vicinity. About 80 men are at work on the Queen of the Hills. Idahoan continues to ship regularly. Bullion ships quite often. Deer Creek mines are shipping right along, and the mining outlook is quite encouraging for the winter. The famous Daisy Black mine, in the Blackburn district, is being patented, and early in the spring a full force of miners will be put on to develop. The Daisy shows an immense body of galena and carbonates, many thousands tons that will average about \$700 per ton. Thirty miners will be put to work on the Lion mine at Vienna next week. The mine is owned and worked by T. E. Cloherty & Co., of Ketchum. It is said to be in excellent condition.

THE MICA WONDER.—The "Mica Wonder" is the name of a mica mine lately discovered and now being worked in the Coeur d'Alene district. Of this wonderful mine the Coeur d'Alene Record says: "The vein is said to be between seven and ten feet thick between well-defined walls of shale and granite. The mineral lies in slanting veins separated by thin layers of soft spar. It is a continuation of the Denver, is of easy access, and can be easily and economically worked. The owners have already declined an offer of \$40,000 for the Mica Wonder, and have also bonded the General Grant for sixty days. It takes but a small cake of clear mica to be worth \$100, as the mineral now brings \$14 to \$22 per pound, according to the quality. The mica of the General Grant is more of a bronze color than that of the Mica Wonder. Mr. Horn expects to return to the mica region in a few days, and several men will soon begin the work of development.

WHEEL FOR SNAKE RIVER PLACERS.—Captain Story, ex-Special Agent of the Land Office, has, after months of experimenting, finally succeeded in perfecting a current wheel with which he expects to raise all the water needed to work his placer claim at Glenn's Ferry. The power supplied by a propeller wheel keeps in operation a centrifugal pump which will raise water to any height desired less than 50 feet. Captain Story says that at no place on his claim will he have to raise the water over 25 feet. The contrivance is called "Story's current wheel," and the inventor, who has applied for a patent, will leave to-morrow to make a practical working test of it.

THE BULLWHACKER.—Wood River Times, Dec. 23: This mine on Deer Creek is showing up well. The tunnel just completed shows ore through the 120 feet of its length. Deer Creek is rapidly coming to the front as an ore producer. We expect the output of ore from this camp will be quadrupled next year.

CHANGE OF MANAGEMENT.—It is stated on good authority that Peter Lane, Jr. is to be superintendent of the Philadelphia Smelting Co., after January 1, 1886. Mr. Lane is a live, energetic, capable man, and his appointment would be hailed with lively satisfaction by mine-owners generally.

NEW MEXICO.

ORE.—Silver City Enterprise, Dec. 14: Another carload of rich ore will be shipped to-day from the Old Man mine. From two to three cars of concentrates are shipped from Carlisle to Pueblo every week. Five different parties are now working and taking ore out of Chloride Flat mines. Some very high grade lots are reported. The Malone mines, at the camp of that name, are being worked regularly by the owners and with satisfactory result. Shipments are made at regular intervals. Six large silver bricks came in on Wednesday's coach, from the Minbres mill. They are worth about \$300 each. The mill runs out about \$1000 per day, which is not so bad. Two outfits—one four and one six-mule team—left here this week for Cook's peak, where they will engage in hauling ore for Johns and Doran to Florida station. Late reports from there say that the property worked by these parties is looking better every day. There are now about 70 tons of ore out and the present workings are all in ore. Preparations are being made for a steady shipping output. The concentrating mill of Shufelt & Co., will resume operations in a short time. It has been thought best to suspend temporarily, or until a supply of ore had been accumulated sufficient to guarantee the steady running of the works. Ore is coming in steadily and from what can be seen there is reason to anticipate an unbroken winter's run. The Rose Mining Company has come into a bonanza. It is as yet too soon to state the size of the pocket, but the ore already extracted may be classed as equal to anything ever taken out of Black Hawk camp. By the ton the ore will run over \$6000 and almost every piece is a cabinet specimen. This is good news for all miners and for the company it is particularly fortunate and opportune, as they will probably at once place a large pump and hoisting machinery on the mine and also purchase a saw mill for the purpose of supplying themselves with mine timbers. The parties now working the Young Man mine, at Malone, are meeting with good success. The work is being done in an open-cut 40 feet in length and from 15 to 18 feet deep. The ore streak shows at both ends and in the bottom for an average width of two feet. Much of it is a high grade chloride and sulphide of silver ore and it is taken down en masse and hand picked, the shipping class being of course the

select of all that is broken down and hoisted to the surface. The Flager works are running steadily on the low-grade mill tails which have constituted the metediferous supply of that establishment. Owing to the exceeding fineness of this material and the consequent difficulty of thoroughly saturating it with dissolving solution, as good progress has not been made as was anticipated. Much of it in fact is an impalpable powder and having lain out for years subject to the decomposing influences of the atmosphere, which have moistened and dried it over and over again until it has become almost like shale, it will be seen that the matter of handling it by a process involving the use of a chemical solution to take up the metallic contents is necessarily slower than it would be with freshly crushed ore. To obviate this and to facilitate the working of the mill to its full capacity, all haste has been made in the preparations to receive outside ore, and as this condition will shortly be reached better results may be looked for. Pulverized ore and the tail now worked will be mixed in suitable proportions and more expeditious work will ensue. About 80 tons are now treated daily whereas by the plan spoken of the amount treated daily will reach 115. The success of the Russell process is now gaining recognition throughout the mining centers of the country, and calls upon the discoverer's time are numerous.

OREGON.

PLACER AND QUARTZ.—Jacksonville Times, Dec. 26: Prospecting is still going on in nearly every portion of the county. H. G. Fitch is engaged in placer mining on Jackson creek and has a good supply of water. Prof. Cailey reports an abundance of water in the districts of Evans and Pleasant Creeks. W. J. Mills and Joe Epperson are at work on Thompson creek and have a good supply of water. The Sterling Mining Co.'s reservoir having been repaired, will soon be used to good advantage again. Gin Lin of Uniontown precinct received a new giant from California recently and is pipping day and night. Ten tons of ore from the Wagner creek quartz mines were shipped to Medford yesterday for reduction. J. N. Casteel was down from Big Applegate a few days since and reports all the miners of that section as busily engaged. All the miners, excepting those who depend on gulches and short streams for water, are able to do considerable work now. Money has been raised to purchase stamps for the Medford reduction works, and it is expected to have a capacity of ten tons every 24 hours. The miners of Josephine county are generally busy, and with few exceptions have considerable water. A good report may be expected from them this season. Wm. Patton, who lives on the road between Wagner creek and Ashland, is ground-slicing on his farm, having already taken out some gold there. Zach. Cameron of Uniontown was in town Monday and reported that the miners of that section all have more or less water, and some of them are quite busy. D. L. Green informs us that there is a prospect of work being resumed on the Yank ledge. J. W. Ingram of Willow Springs informs us that a great deal of prospecting is going on in that and Blackwell districts. The woods are full of prospectors everywhere in southern Oregon. We understand that a very rich strike has been made in the placer claims of Conner creek, Baker county. If the strike is as rich as reported, it is one of the richest ever made in Eastern Oregon. Messrs. Prickett, Finney, Caldwell, Price, Beckner, Bingham and other miners in the Steamboat district were here the forepart of the week, and report plenty of water and good prospects there.

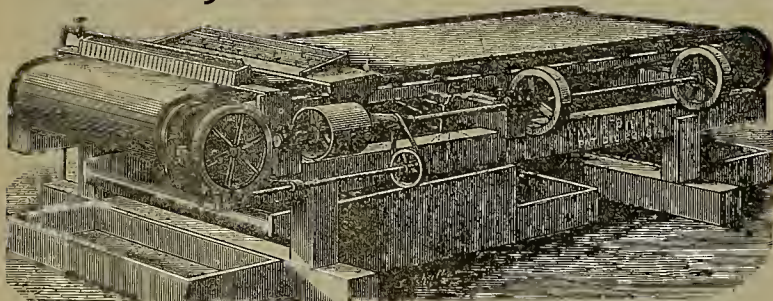
OTHER MINES.—Because there are some excellent mines in the Pine Creek district is no reason why all other mines should be entirely passed by. As we have frequently informed our readers, there are as good mines in the Granite district as can be found on the coast. The Cabell Bros. mine is developing splendidly and the results from all assays made are encouraging in the extreme. Last week J. W. Virtue shipped nine sacks of ore from this mine to the Shelby Smelting Co., of San Francisco, and yesterday received returns of over 258 ounces of silver to the ton. The mines of Granite have not as yet obtained any great boom, and for that reason the prices asked for mining property are not as high as in other sections.

UTAH.

REVIEW.—Salt Lake Tribune, Dec. 25: The week has been one of warm, clear weather for the most part, the sun being even oppressively hot in the valleys. The movements of the metals have been light for the week. The shipments of bullion and ore out from this city for the week ending Saturday, Dec. 19th, inclusive, were 1,514,903 pounds. The receipts of bullion and ore in this city for the week ending Dec. 22d, inclusive, were \$65,128.53, of which \$52,359.29 was bullion and \$12,769.24 was ore. For the week previous the receipts were \$95,256.74 of bullion and \$25,271.30 of ore, a total of \$120,528.04. No reports from the Ontario this week, the mill being shut down. The bullion product stands at \$1,582,463.18 for the year, as per current reports, with 13 dividends of \$75,000 each, or \$975,000 in all. The Stormont sent up during the week two bars of silver \$2,900. The product of the Hanauer smelter for the week was eight cars of bullion, \$20,100; of the Germania, three cars, \$7,648.11. One car of Pascoe bullion came in from Stockton on the 18th. Two cars of bullion from Sprucemount, Nevada, \$3,100, are noted in the week's receipts. Alice bullion, 16 bars, \$16,661.18, was received during the week. Ore receipts were \$2,300 from the Sampson, \$2,400 from the Overland, \$1,853 miscellaneous, Utah; \$3,700 from the Queen of the Hills, \$1,300 miscellaneous, and \$950 Mayflower, Idaho; \$266.24 Davenport ore.

OTHER NOTES.—The Christy Company produced 19,000 ounces of silver last month. The Christy Co. is at present doing the assessment work on eight different unpatented claims in camp. Grant & Hall shipped sixty tons of fair grade ore from the old Leeds mine to the Christy mill last week. The roads to the Stormont mill are again in a good condition, and the regular quantity of ore is being crushed. The managers of the Butte attempted to bail out the water from the mine, but found that it will be necessary to put in a pump; enough water was taken out, however, to drain part of the old works, when the ore exposed made it evident that the property is a big bonanza worth going after,

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As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

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These returns do not include the value of the amalgam saved by the "Triumphs" during the test, which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners.

This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, flaunted by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

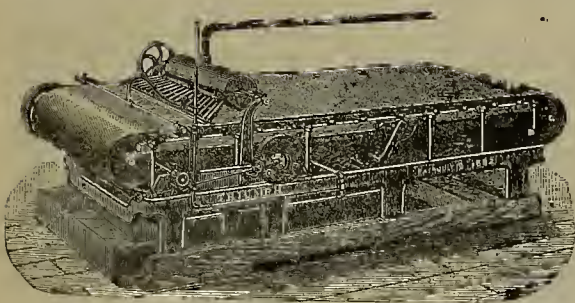
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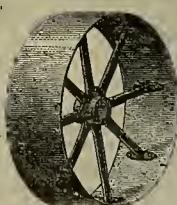
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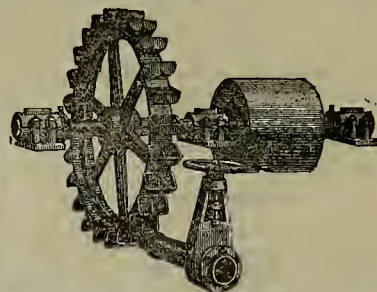
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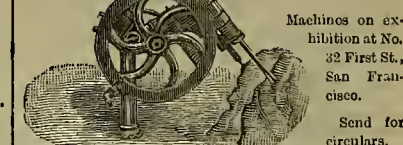
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List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 262 Market St., S. F.

FOR WEEK ENDING DECEMBER 22, 1885

- 332,870—CAR COUPLING—H. H. Bradshaw, Sacramento, Cal.
- 332,872—DIRT-SCRAPER—H. M. Brown, Seattle, W. T.
- 332,786—GRAIN-SEPARATOR—R. M. Cochran, Jaquito, Cal.
- 332,007—WINDOW BRACKET SHELF—E. M. Greer, Stockton, Cal.
- 332,796—BARK-CUTTER, J. C. Haggerty, Santa Cruz, Cal.
- 332,797—BARK-CUTTER—J. C. Haggerty, Santa Cruz, Cal.
- 332,712—CARTRIDGE SHELL CRIMPER—H. T. Hazard, Los Angeles, Cal.
- 332,801—DIE STOCK—J. H. Hines, Calistoga, Cal.
- 332,804—REMEDY FOR BLACKLEG—C. L. Hussey, Sacramento, Cal.
- 332,716—PIANO ACTION—F. Imhorst, S. F.
- 332,909—NAIL-EXTRACTOR—H. K. Hizer, Los Angeles, Cal.
- 332,811—HOUSE-RAISING APPARATUS—Thos. F. Maher, S. F.
- 332,818—DUMPING WAGON—F. C. Milliken, S. F.
- 332,824—FEED WATER-HEATER—Lars A. Olsen, S. F.
- 333,033—ROLLER HINGE FOR GATES—I. E. Tucker, Hanford, Cal.
- 333,092—TRACK-CLEANER AND LUBRICATOR—F. G. Tuttle, Portland, Or.
- 332,765—ROTARY ENGINE—A. W. Van Dorston, East Portland, Or.
- 332,978—CRUSHING ROLL—E. A. Wall, Bullion, I. I.
- 332,851—BARK MILL—Wm. A. Woods, Santa Cruz, Cal.
- 332,769—NEWSPAPER FILE—F. M. Niques, Arcata, Cal.
- 333,047—PIANO ACTION—Jacob Zech, S. F.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Mexican Mines.

Mr. Frank A. Huntington, the well known manufacturer of quartz crushing machinery, has returned from a trip to Chihuahua, Mexico. In the course of a conversation with him, we have gained the following facts concerning the mines of that region:

The famous Santa Eulalia group of mines about seventy in number, all owned by the Santa Eulalia S. M. Co., are situated about twelve miles from the city of Chihuahua, and were first worked by the Spaniards about two hundred years ago. Their underground working consists of 16 miles of tunnels, and numerous large excavations, from which immense bodies of ore have been extracted. The Spaniards worked these ores by smelting, a portion being worked at the old town of Santa Eulalia, situated near the mines, and the balance they packed and smelted at the city of Chihuahua. The indications of their work are still plainly visible in the numerous large slag piles that one sees on all sides as he meanders around the outskirts of the quaint old town.

An idea of the immensity and great value of these mines can best be formed from the fact that in A. D. 1738 a church was built by the Padres, costing over \$800,000, from a tax of one and one half per cent on a dollar of their gross proceeds; and that all this vast wealth was extracted from surface workings, the deepest shafts being only 400 feet, or what California miners would consider only prospect shafts. The future possibilities of these mines can hardly be estimated if worked to a depth of 3000 feet. Traveling through these vast caverns one can hardly believe that they were once filled with solid bodies of ore and that all these immense chambers have been formed by the peons packing it to the surface on their backs, but history tells us that such is the fact.

The mill of the company now working the mines consists of twenty stamps and one five-foot Huntington centrifugal mill, ten amalgamating pans and five settlers. The company expect soon to erect three more Huntington mills and discontinue the use of their stamps, as this will increase the crushing capacity of their mill to 100 tons per day, and with less power than is now used to run twenty stamps. The mill is situated on the Mexican Central Railroad, two and a half miles from the city of Chihuahua. The ore is free milling (silver) and is worked by pan amalgamators in three hours without grinding. The ore is transported over the company's narrow gauge railroad, nine miles, to the mill.

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ASSESSMENTS.									
COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELIN'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Bulwer Con M Co.	California.	2.	20.	Oct 29.	Dec 10.	Jan 20.	W. Willis.	309 Montgomery St.	
Bulwer Con M Co.	California.	2.	20.	Dec 23.	Jan 25.	Feb 27.	J. Connor.	501 Sansome St.	
Chollar M Co.	Nevada.	19.	50.	Dec 30.	Feb 4.	Feb 23.	C. E. Elliott.	363 Montgomery St.	
Champion M Co.	California.	20.	10.	Dec 23.	Jan 25.	Feb 16.	T. Werzels.	522 Montgomery St.	
Davis Cement Co.	California.	5.	02.	Nov 19.	Dec 23.	Jan 27.	C. J. Collins.	512 Montgomery St.	
Eureka Con M Co.	Nevada.	8.	09.	Dec 18.	Jan 21.	Feb 10.	E. H. Wilson.	523 Montgomery St.	
General L & M Co.	Arizona.	7.	00.	Nov 23.	Jan 1.	Feb 8.	G. E. Gullett.	523 Montgomery St.	
Golden Piece M Co.	California.	4.	20.	00.	Dec 23.	Jan 1.	F. Schirmer.	Phelan Block	
Gould and Curry S M Co.	Nevada.	51.	25.	Do 4.	Jan 8.	Feb 1.	A. K. Durbrow.	309 Montgomery St.	
Hathaway Hyd M Co.	California.	8.	45.	Do 8.	Jan 18.	Feb 8.	H. H. Moore.	Montgomery Block	
Julia Con M Co.	Nevada.	21.	10.	Nov 4.	Dec 9.	Dec 30.	J. Stadfeld.	419 California St.	
Maxian Development Co.	Nevada.	2.	10.	Dec 9.	Jan 17.	Feb 1.	A. G. Nunez.	708 Montgomery St.	
Manhattan M Co.	California.	15.	10.	Dec 10.	Jan 12.	Jan 30.	A. B. Brady.	Grass Valley	
North Banner M Co.	Calif. rais.	9.	01.	Dec 8.	Jan 9.	Jan 27.	T. J. Welch.	Grass Valley	
North Bull & Curry M Co.	Nevada.	9.	20.	Nov 23.	Dec 24.	Jan 11.	C. H. Mason.	331 Montgomery St.	
North Peer M Co.	Arizona.	2.	02.	Nov 7.	Dec 10.	Jan 1.	H. Deane.	303 Montgomery St.	
North Peer M Co.	Arizona.	2.	02.	Nov 7.	Dec 10.	Jan 1.	H. Deane.	303 Montgomery St.	
Pennsylvania Con M Co.	California.	3.	01.	Dec 8.	Jan 8.	Jan 25.	M. Byrne Jr.	339 Montgomery St.	
Pine Tree M Co.	California.	1.	15.	Dec 23.	Jan 27.	Feb 15.	C. A. Burdington.	309 California St.	
Potosi M Co.	Nevada.	21.	30.	Dec 30.	Jan 7.	Jan 28.	C. E. Elliott.	523 Montgomery St.	
Russell Reduction & M Co.	California.	1.	25.	Oct 15.	Dec 23.	Jan 19.	J. Mortiz.	523 Montgomery St.	
Virginia Creek Hyd M Co.	California.	5.	05.	Dec 14.	Jan 19.	Feb 11.	J. M. Quay.	416 Montgomery St.	

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Argenta M Co.	Nevada.	E. M. Hall.	327 Pine St.	Annual.	Jan 11
Silver King M Co.	California.	J. Nash.	323 Montgomery St.	Annual.	Jan 12
Silby Smelting Co.	California.	Called by Directors.	416 Montgomery St.	Special.	Jan 22

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Cal-donia M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Dec 24
Jackson M Co.	California.	D. C. Bates.	10.	Oct 5	
Manhattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Sep 1
Silver King M Co.	Arizona.	J. Nash.	323 Montgomery St.	25.	Dec 15
Syndicate M Co.	Nevada.	J. Stadfeld Jr.	419 California St.	10.	Dec 24

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GORUM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.			Red Bluff.			Sacramento.			S. Francisco.			Los Angeles.			San Diego.		
	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.
Dec. 24-26.																		
Thursday.....	.08	61 W	LR.	.40	54 S	LR.	.02	63 SE	Cy.	—	64 SE	Th.	.00	70 E	CL.	.00	67 W	CL.
Friday.....	.25	48 S	LR.	.45	56 S	Cy.	1.87	58 SE	Fr.	70	60 S	Cy.	.00	68 S	Fr.	.00	67 W	CL.
Saturday.....	.05	47 SE	Cy.	.45	53 N	CL.	.58	53 NW	Cy.	.70	54 NW	Fr.	.51	54 E	Fr.	.02	64 SW	Fr.
Sunday.....	.00	44 SE	Cy.	.00	58 N	CL.	.00	54 NW	CL.	.00	55 NE	CL.	.03	58 S	CL.	.45	54	Th.
Monday.....	.22	48 S	Cy.	.00	56 N	CL.	.00	51 SW	Fr.	.00	56 N	CL.	.00	61 SW	Fr.	.12	62 SW	CL.
Tuesday.....	.27	45 SE	LR.	.00	50 NW	Cy.	.00	45 NW	Fr.	.00	54 N	CL.	.00	60 NE	CL.	.00	59 W	CL.
Wednesday.....	.56	41 S	Cy.	—	52 S	Fr.	.00	49 NW	Cy.	.02	57 W	Fr.	.00	61 W	Fr.	.00	60 W	Cy.
Totals.....	1.43			1.30			2.45			1.42			.59			.59		

EXPLANATION.—CL for clear; Cy, cloudy; Fr, fair; Fy, foggy; — indicates too small to measure. Temperature wind and weather at 12 noon. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco.

PAXATILA MINING CO.—Dec. 26. Location, Sinaloa, Mexico. Capital stock, \$60,000. Directors, D. L. Sheard, C. G. Bulton, H. F. Webster, D. Maclean, and C. Campbell.

WESTERN SHIPBUILDING AND NAVIGATION CO.—Dec. 27. Object, to construct and navigate steamers. Capital stock, \$3,000,000. Directors, Walter Forward, A. F. Anderson, H. C. Wilson, B. C. Duffy and N. Bauregard.

PACIFIC INDICATOR CO.—Dec. 27. Object, to manufacture and sell indicators. Capital stock, \$100,000, in 10,000 shares. Directors, M. M. Rhorer, N. W. Griswold, A. S. Rhour, J. T. Hanna, W. W. Brier, Jr., Edwin S. Irwin and F. Roland.

MERCHANTS AND CLERKS LAND ASSOCIATION.—Dec. 29. Capital stock, \$55,000. Directors, B. C. Hawes, Samuel Mosgrove, C. A. Boynton, A. O. Hazelhurst, Chas. McDougall, A. Goodchaux and Ezra Fowler.

CALIFORNIA PAYING CO.—Dec. 29. Capital stock, \$250,000, in shares of \$505 each. Directors, J. Shurer, Thos. Gamard, Wendell Easton, Chas. Warren, Theodore Reichart.

MEXICAN GOLD AND SILVER MINING CO.—Dec. 29. Location, Harris district, Douglas Island, Alaska. Capital stock, \$10,000,000. Directors, J. D. Fry, James Freeborn, T. J. Hay, James Treadwell and C. F. Stone.

ADMIRALTY GOLD AND SILVER MINING CO.—Dec. 29. Location, Harris district, Douglas Island, Alaska. Capital stock, \$10,000,000. Directors, J. D. Fry, James Freeborn, T. J. Hay, James Treadwell and C. F. Stone.

Mining Share Market.

The resumption of deep sinking the combination shaft of the Chollar, Norcross and Savage Mining Companies—sinking for the 3200 level, 100 feet deeper than heretofore attained, and also the proposed resumption of work at the Osbiston shaft, which is to be pumped out and sunk to a corresponding depth with the Combination shaft, the two to operate together in the drainage and development of the middle mines has given a better outlook to mining affairs on the Comstock. Operators in the market here are more hopeful now that deeper workings are again to be commenced. These two new movements in the mining management, combined, form a very interesting and promising feature in the deep level development, and if as effectually carried out as they promise to be, they cannot fail to have a great influence in the possible resumption of deep workings throughout the middle and northern sections of the great Comstock lode.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 10.	WEEK ENDING Dec. 17.	WEEK ENDING Dec. 24.	WEEK ENDING Dec. 31.
Alpha.....	.40	.55	.25	.40
Alta.....	.20	.25	.15	.20
Andes.....	.25	.30	.15	.20
Argenta.....	1.30	1.00	.90	1.05
Belcher.....	1.30	1.00	.90	1.05
Belling.....	1.15	1.10	1.20	1.15
Best & Belcher.....	1.15	1.10	1.20	1.15
Bullion.....	.25	.20	.25	.30
Bonanza King.....	.55	.65	.60	.50
Bodie Isle.....	1.35	1.45	1.25	1.55
Bodie Con.....	1.65	2.00	1.60	1.55
Benton.....	.55	.60	1.05	.75
Bodie Tunnel.....	.55	.65	.60	.50
Bulwer.....	.55	.65	.60	.50
California.....	1.35	1.45	1.25	1.55
Challenge.....	.05	.05	.05	.15
Champion.....	.95	1.10	.85	1.00
Chollar.....	.95	1.10	.85	1.00
Confidence.....	1.00	.90	.85	.85
Con. Imperial.....	1.25	1.45	1.20	1.55
Con. Virginia.....	1.25	1.45	1.20	1.55
Con. Pacific.....	.70	.85	.75	.60
Crown Point.....	1.25	1.30	.95	1.15
Day.....	2.25	2.30	2.10	2.00
Eureka Tunnel.....	2.25	2.30	2.10	2.00
Exchequer.....	.25	.20	.15	.15
Grand Prize.....	.70	.80	.75	.60
Gould & Curry.....	.70	.80	.75	.60
Goodshaw.....	.05	.05	.05	.15
Hale & Norcross.....	3.00	4.75	3.50	4.20
Holmes.....	.75	8.25	.94	11.11
Independence.....	.05	.05	.05	.15
Julia.....	.05	.05	.05	.15
Justice.....	.05	.05	.05	.15
Martin White.....	.05	.05	.05	.15
Mono.....	3.70	5.25	3.90	4.45
Mexican.....	.40	.75	.55	.60
Mt. Diablo.....	2.65	.00	.00	4.00
Norcross Belle.....	.50	.55	.45	.35
Norcross.....	.50	.55	.45	.35
North Belle Isle.....	.90	.75	.60	.75
Occidental.....	.95	1.75	.50	.85
Optim.....	.25	.25	.15	.15
Potom.....	.25	.30	.15	.15
Pinal Con.....	1.50	1.95	1.65	1.70
Savage.....	1.50	1.95	1.65	1.70
Seg. Belcher.....	.65	.75	.60	.55
Sierra Nevada.....	.65	.75	.60	.55
Silver Hill.....	.05	.05	.05	.15
Silver King.....	.05	.05	.05	.15
Scorpion.....	.05	.05	.05	.15
Syndicate.....	.25	.25	.15	.15
Tioga.....	.45	.55	.40	.30
Union Con.....	.45	.55	.40	.30
Utah.....	.60	.65	.60	.50
Yellow Jacket.....	1.55	1.50	1.15	.60

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Dec. 31	15 Kentucky.....	55c
50 Belcher.....	100 Mexican.....	4.70
120 B. & Belcher.....	200 Mono.....	4.70
340 Bodie Con.....	50 Mt. Diablo.....	3.50
200 Bulwer.....	100 Nevada.....	3.00
550 Chollar.....	150 Ohio.....	4.00
200 Crown Point.....	1000 Ophir.....	4.00
50 Con. Pacific.....	5500 Pacific.....	9.00
870 Con Va. & Cal.....	1000 Sierra Nevada.....	5.5c
300 Gould & Curry.....	500 Scorpion.....	0.5c
335 Hale & Norcross.....	50 Union Con.....	0.5c
130 Justice.....	200 Yellow Jacket.....	3.0c

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Market Reports.

Lumber at Wholesale.

The Redwood Lumber Association has established no prices since the first of the year. Redwood.—Cargo prices are at present as follows: Rough, merchantable, @ M ft., \$13.00; Rough, clear and surfaced, \$23.00; 1x10 Rustic, No. 1, \$24.00; 1x10 Rustic, No. 2, \$19.00; 1x8 V Rustic, No. 1, \$22.00; 1x6, tongued and grooved, \$21.00; 1x4, tongued and grooved, headed, \$23.00; 1-in. x 3, Battens (board measure), \$30.00; Shingles, @ M, \$1.65. Pine.—Rough, \$15.00; No. 2, \$12.00; do do in lengths, \$13.00; rough, 40 to 50 ft lengths, \$16.00; do 50 to 60 ft, \$17.00; T and G Flooring, 1x6, \$26.00; do do 1x6, \$28.00; do do 1x4, \$28.00; do do No. 2, \$21.00; Vertical Grain T and G Flooring, 1x6, \$30.00; do do do 1x6, \$32.00; Stepping, \$37.50; Furring, 1x2, per lineal ft, 3c.

Lumber at Retail.

Prices fixed by the association April 1st are as follows: Pine, Rough.....\$15 00
" " No. 2....." 12 00
" " 2 in lengths....." 13 00
" " 40 to 60 feet lengths....." 16 00
" " 60 " 60 "....." 17 00
T. & G. Flooring 1 x 6....." 26 00
" " 1 x 6....." 23 00
" " 1 x 4....." 28 00
" " No. 2....." 21 00
Vertical Grain T. & G. Flooring, 1 x 6....." 30 00
" " 1 x 6, 1 x 4....." 32 00
Stepping....." 37 50
Furring, 1 x 2, per lineal foot....." 03
Redwood, Rough....." 17 00
" " No. 2....." 18 00
" " Surfaced....." 30 00
" " 1 x 8....." 28 00
" " 1 x 6....." 28 00
" T & G. 6 in. 12 ft. and over....." 28 00
" " 7 to 12 ft....." 26 00
" " under 7 ft....." 20 00
" Rustic....." 30 00
" " No. 2....." 25 00
" T. & G. Beaded 12 ft. and over....." 30 00
" " 7 to 11 ft....." 26 00
" " under 7 ft....." 20 00
" Sliding, 3 in....." 22 00
Pickets, Fencing....." 26 00
" Rough Pickets....." 16 00
" " Square....." 14 00
Battens, 3 x 3 per lineal ft....." 03
Shingles....." 2 00
Laths, 1 in....." 3 25
" 1 1/2....." 3 75
Dunnage Boards less 5% delivered....." 16 00
Price subject to change without notice.

Coal.

PRICES "TO ARRIVE." Per Ton. Per Ton.
Australian.....\$6 00 @ 6 1/2 Cardiff.....\$6 75 @ 7 00
Liverpool Steam 5 02 1/2 5 75 Lehigh Lump. 13 50 @ 14 00
West Hartley.....7 00 @ 7 25 Cumberland bk 8 00 @ 8 25
Scotch Splint.....6 50 @ 6 75 Egg, hard.....10 00 @ 10 00

SPOT PRICES.

Per Ton. Per Ton.
Australian.....\$5 87 1/2 Cardiff.....\$7 00
Liverpool Steam.....6 75 Lehigh Lump.....14 00
West Hartley.....7 60 Cumberland, bulk.....8 50
Scotch Splint.....6 76 Egg, hard.....1

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- 10.—Picturesque Arizona, 350 pages, in cloth and gilt. Postpaid for 25 cts. 1.25
- 11.—California, 100 pag. e, Magazine, 1880 to 1885 (5 Vols.) single Nos. Postpaid for 3 cts. .35 For volume, unbound, 5 Vols., Postpaid for 20 cts. 2.00 For volume, bound, cloth, back and stiff paper sides. Postpaid for 40 cts. 2.50
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ASSESSMENT NOTICE.

Pine Tree Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Summit Mining District, Kern County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 22d day of December, 1885, an Assessment (No. 1) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 4 (second floor), 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 27th day of January, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 15th day of February, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y.

OFFICE—Room 4 (second floor), 309 California Street, San Francisco, Cal.

ASSESSMENT NOTICE.

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ASSESSMENT NO. 51.

Levied. December 4, 1885
Due in Office. January 8, 1886
Amount. 25 Cents per Share
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ALFRED K. DUBROW, Secretary.
OFFICE—Room 69, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half-year ending December 31, 1885, the Board of Directors of the German Savings and Loan Society has declared a dividend at the rate of four and one-half (4 1/2) per cent per annum, on term deposits, and three and three-fourths (3 3/4) per cent per annum, on ordinary deposits, and payable on and after the 2d day of January, 1886. By order. GEO. LETTE, Secretary.

DIVIDEND NOTICE.

San Francisco Savings Union, 532 California St., cor. Webb.

For the half-year ending December 31, 1885, a dividend has been declared at the rate of four and one-half (4 1/2) per cent per annum, on term deposits, and three and three-fourths (3 3/4) per cent per annum, on ordinary deposits, free from taxes, payable on and after January 2, 1886. LOVELL WHITE, Cashier.

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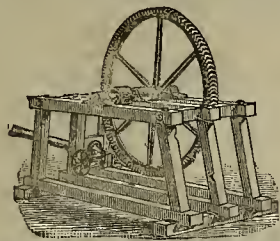
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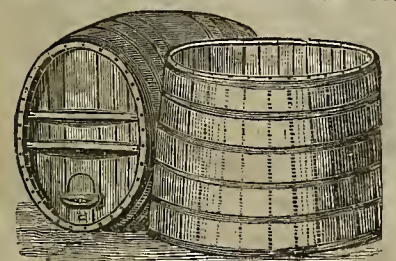
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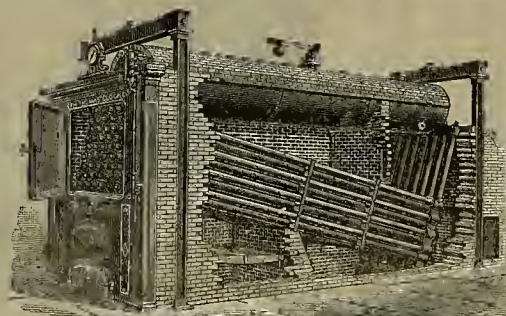
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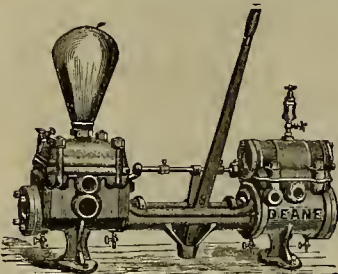
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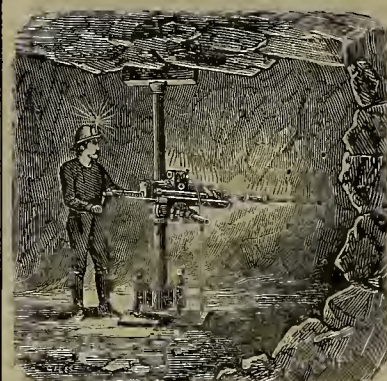
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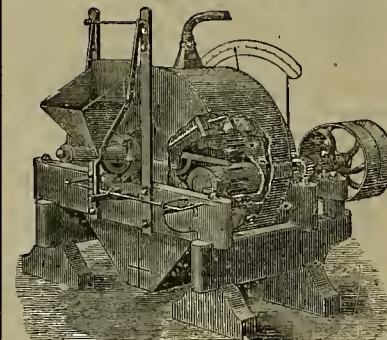
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[From the Engineering & Mining Journal, Aug. 8, 1885.]
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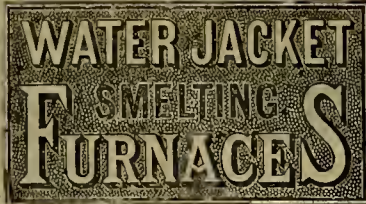
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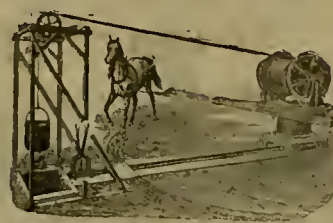
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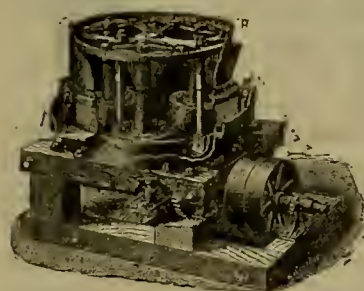
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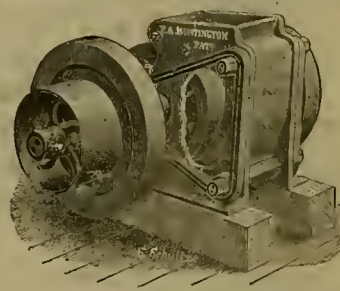
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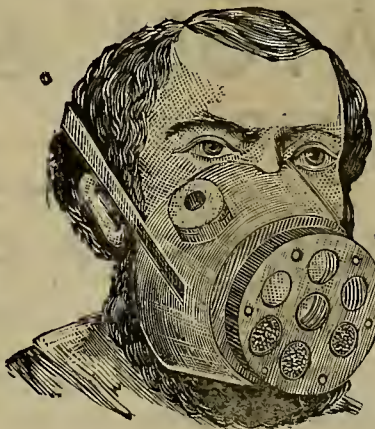
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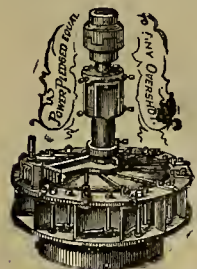
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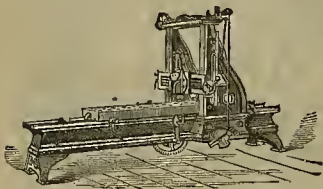
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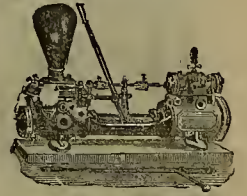
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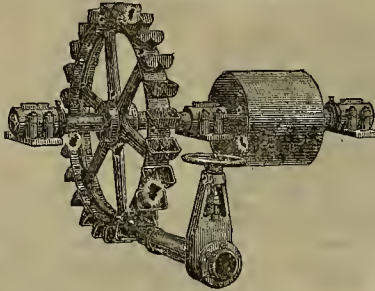
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SAN FRANCISCO, SATURDAY, JANUARY 9, 1886.

VOLUME LII
Number 2.

An Automatic Steam Trap.

A steam trap is intended to remove or separate the condensed water from steam. The engravings on this page illustrate the Watson & Gankroger self-regulating automatic steam trap, recently patented, and manufactured in this city by W. T. Garratt & Co., 138 and 142 Fremont street. *A* is the trap body; *B*, hollow float; *C*, suspension valve; *D*, brass ribbon; *E*, clamping nuts; *F*, counter-balance lever; *G*, counter-balance weight; *H*, discharge valve; *I*, connecting lever; *K*, float suspension links; *L*, cup; *N*, stop; *V*, inlet opening; *P*, outlet opening; *S*, glass water-gauge.

The manufacturers claim the following advantages for this device: The discharge valve is a balanced double-seated poppet valve, placed in a vertical position, the area of the valve being in excess of the area of the inlet pipe, thus absolutely preventing the trap from becoming water-logged, as the water leaves the trap as rapidly as it can possibly enter it; this is a feature peculiar to this steam trap. The seats of the valve and the valve itself are washed every time the valve opens, and the valve being in a vertical position, no sediment can be retained on either the seats or valve, and the valve closes absolutely tight after each discharge. The float is a cast iron basin, open at the top; being larger at the surface than at the bottom, rendering it impossible to crack or collapse by frost or other means. Each steam trap is provided with a glass water-gauge, enabling the operation of the trap to be observed at a glance.

The connections between the float and counterbalance lever are purposely made of small brass wire and a flexible brass ribbon to overcome friction. No stuffing box is required; but to guard against the possibility of leakage in case of extreme steam pressure or defective fit of float steam, a gland nut is provided. In experience of several hundred of these traps the manufacturers have found packing around the stem entirely unnecessary. This steam trap will work equally as well with one pound steam pressure as with one hundred; no modification is necessary to meet varying pressures. To put the trap together the following directions are given: Set the trap level; make proper connections to inlet and outlet openings; insert suspension wire *C* to the bottom of hole in clamping nut on top of float, and firmly secure it with the clamping nut *F*. Place counter-balance lever *E* on its pivots and insert brass ribbon *D* to the bottom of slit in the upper part of clamp and secure it firmly with the clamping nut. Fill *B*, hollow float, with water, securely bolt on the cover of the trap, place water gauge in position and properly pack same. Turn on the steam and adjust counterbalance weight, *G*, so that the float will rise when water shows in the gauge glass to within about two inches from the top of the glass; secure the counter weight by the set screw; after this no further attention is needed.

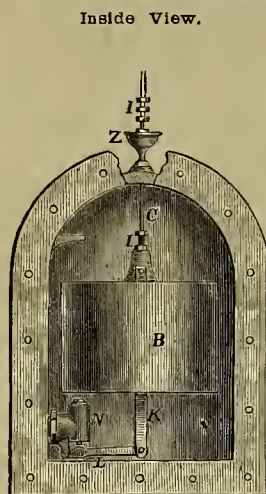
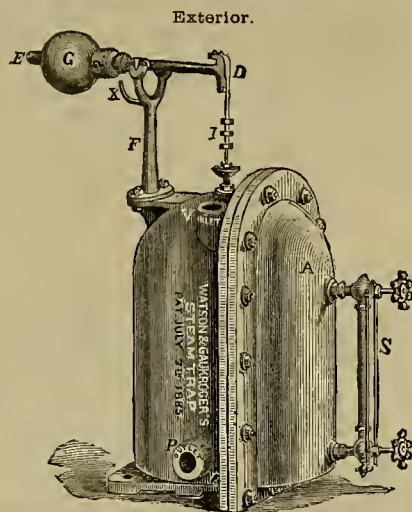
The great strike of the Monongahela coal miners is over, the men having gone to work again. It is estimated that over \$1,500,000 has been lost by the strike.

Killing Marine Insects.

In many seaports, and especially on this coast, certain marine insects, notably the teredo and limnoria, are very destructive to wooden piles which have been driven for wharves and landings, and by incessant boring they soon honeycomb the wood so that it is entirely destroyed and the piles must be replaced by new ones. Many plans of poisoning the wood, etc., have been tried to prevent this. Mr. John Dolbeer, the well-known saw-mill owner, of

the tube may be unclamped and removed to another, and the treatment be repeated. In some cases it may be found desirable to introduce a poisonous substance, which will be sufficiently powerful to destroy animal life; but Mr. Dolbeer states that he has found the high temperature applied in the manner described as usually sufficient for the purpose.

THE Tucson *Star's* annual review of Arizona gives the following summary: Population, 65,000; value of real and personal property,



WATSON & GANKROGER'S SELF-REGULATING AUTOMATIC STEAM TRAP.

this city, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency an apparatus to prevent the ravages of the worms, which is quite original. The piles may, by this, be treated after they have been driven, and where they are partially submerged and exposed to the attacks of the marine insects. It consists of an inclosing case made sepa-

\$98,000; head of live stock, 500,000; grain product, 74,600,000 pounds; gold dust and bullion, \$282,614; silver bullion, \$2,671,400; ore shipments, \$1,831,500; copper produced, 24,360,000 pounds.

THE Coos Bay *News* reports another failure in the matter of attempting to separate the

Measuring Globules of Silver.

As the amount of lead which can, in blowpipe assaying, be conveniently cupelled before the blowpipe is necessarily limited, the silver globule which remains on the bone-ash surface of the cupel at the end of the operation is, when substances poor in silver have been examined, frequently so very minute that its weight cannot be determined by the most delicate balances in general use. Blowpipe balances will turn with one-thousandth of a grain, but on determining weights below that are not accurate. Globules of silver of far less weight than one thousandth are distinctly visible to the naked eye—a circumstance which induced Harkort to invent a volumetrical scale based upon the measurement of the diameters of the globules, which scale in practice has been found of great utility in the blowpipe assay of silver.

The scale for this purpose which is employed by Mr. Geo. Attwood, author of "Practical Blowpipe Assaying," is shown in full size in the accompanying wood-cut.

This figure represents a small strip of highly polished ivory about six and one-half inches long, two-thirds inch broad, and one-eighth inch in thickness, on which are drawn by an extremely fine point, two very fine and distinct lines, emanating from the lower or zero point, and diverging upward until, at the distance of exactly six English standard inches, they are precisely four-hundredth parts of an inch apart. This distance (six inches) is, as shown in the wood cut divided into 100 equal parts by even lines numbered in accordance from zero upwards.

It is now evident if a small globule of silver be placed in the space between these two lines, using a magnifying glass to assist the eye, or moving it up or down until the diameter or globule is exactly contained within the lines themselves, that we have at once a means of estimating the diameter of the globule itself, and therefrom are enabled to calculate its weight.

The flattening of the globules makes it difficult to calculate directly from their diameters as spheres, but require to have their actual weight experimentally determined in the same manner as employed by Plattner.

A table of weights to accompany this scale is given in Mr. Attwood's book. The weights are calculated from the following data, found as the average result of several very careful assays, which showed that globules of silver exactly corresponding to No. 95 of this scale, or 0.038 inch in diameter, possessed a weight of 0.0475573 grains or 0.003079 grain. From this the respective weights of all other numbers or degrees on this scale were calculated, on the principle that solids were to one another in the ratio of the cubes of their diameters. This is not exactly correct on account of the flattening of the under surface of the globule, but the difference is small.

DEMANDS have been made upon the authorities at the Carson mint by the attorney for the Citizens' Committee to receive and coin bullion, which were refused. The object was to obtain a foundation for a suit to compel the Government to obey the law concerning the mints.



SCALE FOR MEASURING SILVER GLOBULES FROM BLOWPIPE ASSAYS.

able so that it may be applied to a pile or portion and closed around it, and a means for injecting into the interior space, thus enclosed, steam or any other substance. He does not propose to try to prepare the wood before it is put to use, but to kill the worms when they get into said wood. The enclosure for the pile is formed of two semi-cylinders hinged together at one edge, and surrounding the pile or structure. Pipes are provided for introducing a current of steam or other destructive material into the inclosure and between the sides of the same and the pile. Peculiar wedges or keys are used for locking the semi-cylinders together, and they are so arranged as to be locked or unlocked from above the surface of the water. The steam from the steam pipes heats the water, which is inclosed within the tube around the pile, to a temperature depending on the amount of steam admitted. This process is carried on long enough to destroy all animal life within the pile, when

gold from the black sand of the ocean beaches. Pugh & Co. are the parties who have come to grief this time. The man who can succeed in inventing a sure process for saving the fine gold of the beach will aid materially in increasing the circulating medium on this coast and elsewhere.

THERE is not a claim in Pioche that has secured U. S. patent. Owing to the jumping and rascality resorted to, to obtain possession of mining ground in this district, up to within the last 10 years, it would have been impossible to obtain patent from the Government. The Pioche *Record* properly says: "The United States land offices do not issue patents to mining claims, the title to which the owners secured by hiring armed desperadoes to go to take possession of and drive off the rightful owners, as soon as it showed to be of any value."

A REVIVAL of mining in San Antonio district, Nevada, is among the probabilities of the year.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—E.D.

Montana Mines.

[By R. G. HURON.]

Continuing our description of the mines from last week, I may mention that the Banner mine, owned by F. J. Lowry and others, of Helena, is now under a working bond and is thought to be a good property. The Belle of Bellvue, owned by Dr. Brooke, of Helena, is near by, and has been developed to a considerable extent.

The Minnesota has also been worked to a considerable extent, and some money has been made, but is now lying dormant, for what reason I could not learn. Whilst at Gregory I learned of some

Discoveries Being Made

Up in Basin gulch, near the head, and was shown some very fine looking ore from them, but they were not sufficiently developed to know to any certainty as to permanency. It ought to be good. I will say that much, for it was being developed by a man and his wife, she making a hand on the windlass. I, for one, wish them full success.

On the mountain, half way between Gregory and Wickes, is two locations, and very good ore in large quantities has been taken from each of them. They are called the North Pacific and the North Atlantic. The former is owned by the Reduction Company, of Wickes. They are each working a small force of men prospecting. The ore in each of these mines seems to lie in bunches, with no particular wall or anything else to guide to another bunch when it gives out.

From Wickes to Elkhorn it is 30 miles straggling on a pretty rough road, and it was dark when I arrived there. It is a primitive mining camp and no mistake. I would advise a stranger, without he is a good rustler, to take his blankets with him, as hotel accommodations are scarce. The mine is a good one, without a doubt, as it is a close corporation, and no interest for sale, which is good evidence of what I say. It is owned in five interests by A. M. and M. M. Holter, John Kinna, John Shober and Neil Vawter. The mine is operated through an incline, is down about 600 feet, and this ledge averages about 6 feet in width. They have some ore that does not require roasting, but most of it does. They are supplied with one of the Howell improved continuous feed and discharge furnaces, and they are well satisfied with its operations. Their bullion contains quite a percentage of gold, and whilst their ledge is not extremely large, they have no difficulty in keeping their plant running. The mine is ably superintended by an old-timer of Nevada and California, named Kilhoun, who thoroughly understands his business.

The J. R. Keene lode, an extension of the A. M. Holter mine, is owned by S. T. Nicholson and E. M. Jamison, who have a shaft down 90 feet, and from a sample three-ton lot milled netted them \$207—a pretty good return. They feel confident that their property is as good as the one the Elkhorn Company are working on. The good luck is certainly deserved, as Mr. Nicholson has remained in this camp at times when everybody deserted it, and has been there continuously for seven years.

On my way down to Boulder next day we were treated to a genuine upset of the stage coach, but as nobody was seriously hurt we picked ourselves up and turned the old coach over and traveled on. A member of the house of Israel, riding on the seat with the driver, was unfortunate enough to measure swords with a boulder in the fall and his nose came off second best, but he was mollified by receiving a free pass to Wickes, and went on his way rejoicing. After we all had a good warm dinner with mine host, Trotter, of the Boulder Valley hotel, were in comparatively good spirits all around.

Boulder Valley is the County Seat

Of Jefferson county, and to all appearances is a prosperous, enterprising burg. Their close proximity to mining districts will tell to their advantage. The Amazon mine and works are within three miles of town. Just at the time of my visit, the mine and works were shut down for a short time and I did not make a visit in form, but I understood from a party who was interested that it would remain so only for a short time. From Boulder I went by Gilmer & Saliebury line of stages to Butte, a distance of 36 miles, a good road leading up Boulder creek and then over one of those parks that frequently open out in these high altitudes, and before I arrived at Butte I had a chance to find how cold a man can get and yet not freeze. On looking around Butte for a day or two, I concluded to postpone going over the town in the interest of the PRESS until after pay day, and went from there to Anaconda, 22 miles, by rail.

The Cable Mine.

Thence I went to Cahle and Phillipsburg, a distance of 35 miles, in a northwesterly direction from Butte. The Cahle divide is a very high one, and cold in proportion. The Cahle mine is one of the oldest mines in the territory, machinery having been erected there 18 years ago, and some of the richest gold ore ever taken

out in the country has come out of this claim. They have pounded out in a quicksilver tank as high as \$1000 per day. It is now owned by two gentlemen of Des Moines, Iowa, named Hubbard & Savery, and is managed by Mr. Savery. They own many other properties around here, and virtually run the town of Cahle. The 30-stamp mill, finely appointed with Ingersoll Air Compressor, capacity for five drills, general store, boarding house, and in fact everything, is under their management. Three miles southwest from Cahle is the

Silver Lake Mining District.

Where there are a number of locations and considerable work has been done. Mr. John Sloss, amalgamator for the Cahle Co., has a property there which he thinks will prove a good one; at present he has it leased to some parties who are now at work on it, and are getting out some fair silver ore. Two miles to the north on the Phillipsburg road, is the town of Georgetown, where years ago some placer mining was carried on, but is now the location of the Pyrenes mine, a gold bearing lode, and owned by S. Cameron, R. H. Kelley and Mrs. J. A. Moss. The width of lode runs from two feet to eight feet, and pays from \$10 to \$20 per ton, the average running from \$15 to \$18. They are now working from a tunnel, striking the lead in some 30 feet; are working a small force and running a five-stamp mill. They have a contract to sell to a Glasgow Co., and from the fact that the company went to work and put in a large amount of cordwood and other supplies, and paid for them, it looks as if they meant business, and if they do take it there is no doubt that they will increase the working facilities as there is a large percentage lost in working the way they are now.

Half a mile further down is a mine called the Ontario, owned by Messrs. George Kidder and Dr. Merrill. This mine, while it is not developed to any great extent, has produced some very fine ore. A shipment made to Anaconda a short time before I was there returned over 400 oz. silver per ton. This was selected ore, of course, but it only seems natural to think that there is plenty more there, which, if not as good, is yet good enough to stay by. Mr. Kidder and I having mined on the same gulch eighteen years ago, I was very glad to find him with so fine a prospect. These mines are in such high altitude that in order to do work to any advantage have to be well prepared for winter.

Phillipsburg

Lies some 16 miles north of the Cahle, and is on a tributary of Flint creek. This town was started about the same time the Cahle mine was discovered; the mine on which its first hopes were based was the Hope. It is still being operated and is one of the main stays of the camp. It is operated by a St. Louis company; Charles Tausig, President; John C. Porter, Vice-President; Louis Duestrow, Treasurer; Charles A. Cuno, Secretary. The mill of this company is at the present shut down and they are sinking a shaft to work a new ore chute discovered by the use of the diamond drill, their ore bodies being different from any other mine in this part of the country, lying flat as it were, and do not confine themselves within two wallrocks. But this seems to be one of the mines that the diamond drill is peculiarly fitted for prospecting. Through the kindness of Mr. Bahcock, the efficient superintendent, I was able to learn the cost of the diamond drill prospecting. The operating in the Hope mine cost the company \$1.86 per foot; this, through hard ore and manganese, makes it a cheap mode of prospecting. The assays from the cores of the drill in this new ore chute are very much higher than the company have been working on for some years past, consequently the Hope Company feel that they have an era of prosperity ahead of them that will make up for all their efforts in the past. The company have a finely appointed mill, and consequently gave a high percentage of the assay value. Some of the machinery is of the old pattern, but withal is capable of doing very satisfactory work. On the new shaft is a steam hoist, which will be a vast improvement over the old whim in speed and economy in every way. The shaft will be nearly 300 feet deep, and they expect to strike the ore body by the first of the year, when they will put on a full force and will materially assist the prosperity of Phillipsburg. There is another mill property a short distance above the Hope, called the Northwest, but it is idle, and has been for a long time. In a gulch south of Phillipsburg is another mill property, called the Algonquin, one of the finest appointed mills in Montana. It is also shut down at present, owing to the burning of the hoisting works on the Trout mine some time ago. The Mill Company also own some properties near by, but are in litigation about them and there is no telling when they will get a going. There is quite a number of mines leased here and select their ores and ship to Helena and Wickes for reduction. If it pays to do that, it would certainly pay in town to work it if they are as well provided with machinery and works at the Algonquin as I have been informed.

THE Bird's Eye Creek mine in this State, owned by an English company, has paid a dividend of \$7500, the second of the same amount for 1885.

A CHINAMAN, at Poverty Hill, while cleaning out an old tunnel, was killed by a cave last week.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

NEWSPAPER FILE.—Frank M. Niques, Arcata, Humboldt Co., Cal. No. 332,769. Dated Dec. 22, 1885. This new paper file is arranged so as to be adjustable for large or small papers or periodicals.

REMEDY FOR BLACKLEG.—Chas. L. Hussey, Sacramento. No. 332,804. This is a medical compound, the object of which is to prevent that disease of cattle known as blackleg. There are several ingredients used.

HOUSE-RAISING APPARATUS.—Thomas F. Mather, S. F. No. 332,811. Dated December 22, 1885. This house raising apparatus consists in peculiarly constructed adjustable frames and nuts, adapted to be fitted to their places and the work continued without having to remove the lifting screw during the whole operation. The object of the invention is to provide means for completing the full operation of raising or lowering a house without having to remove the lifting screws.

BARK CUTTER.—John C. Hagerty, Santa Cruz. No. 332,796. Dated Dec. 22, 1885. This invention relates to a machine for cutting bark and preparing it for tanners' use. In this machine there is an arrangement by which any desired number of feed openings may be employed and the bark introduced at different points around the circumference so that the cutters will be constantly at work and a larger amount of bark can be prepared than where there is a single feed opening.

BARK MILL.—Wm. A. Woods, Santa Cruz, assignor to John C. Hagerty. No. 332,854. Dated Dec. 22, 1885. This bark mill consists of a drum rotating within an outer casing and having hollow, cylindrical chambers with closed ends formed at intervals around its periphery. These chambers have curved knives or cutters fitted in them so that their edges project just beyond the periphery of the drum, and the bark being fed into an apron or chute in the case, which delivers it so that it rests against the periphery of the drum, these cutters will clear it off, so that it is discharged through the opening in the lowest point of the case.

GRAIN SEPARATOR.—R. M. Cochran, Jacinto, Colusa Co. No. 332,786. Dated Dec. 22, 1885. This is a machine for separating grain from the straw and chaff after it has been thrashed. It comprises a main carrying-helt and straw-carrier, beaters and pickers and cleaning shoe, an open inclined traveling belt moving over partial floors or bottoms, the lower floor being slotted to allow the grain to fall through a partially covered rack beneath said slot upon which the grain and unthrashed heads are received, a cleaning shoe situated beneath said rack, and fans and conveyors for grain and unthrashed heads.

DIE-STOCK.—Joseph H. Hines, Calistoga, Napa Co. No. 332,801. Dated December 22, 1885. The device is intended for cutting screws. It consists of dies with an inclosing head or case, having ratchet-teeth upon its exterior periphery; a chambered stock, within which the ratchet is fitted, and a means for retaining it therein; handles extending on opposite sides of this stock, and provided with spring-pawls, which engage the ratchet head upon opposite sides, and a sliding key or lock by which the ratchet head is prevented from revolving at will.

AUTOMATIC FANNING MILL.—Harry S. Zink, Sacramento, assignor of two-thirds to Richard Reed and H. S. Ruhlman. No. 332,470. Dated Dec. 15, 1885. This fanning mill comprises a power wheel adapted to be rotated by the grain itself as it passes from a superposed hopper; a directing chute, riddle and fan, said fan and riddle being connected with and operated by the power wheel, and an agitator or feeder within the hopper, also connected with and operated by the power wheel, whereby the grain is fed constantly and evenly. The object of the invention is to provide a fanning mill, which is adapted to be operated automatically by the weight of the grain in the hopper, and to continue its operation as long as the hopper is supplied.

OYSTER OPENING DEVICE.—C. Leduc, Denver, Col. No. 332,403. Dated Dec. 15, 1885. The invention relates to that class of oyster-opening machines, in which the oyster is held in a suitable bed or clamp, and is opened by the insertion of a knife or blade upon a pivoted lever; and the invention consists in a peculiar pivoted and jointed lever carrying the knife or blade, which is thereby adapted to be moved through an arc on a vertical plane to penetrate between the valves of the oyster shell, and to be turned at right angles to the plane of its first movement, whereby it is enabled to pry the shell open. It consists, further, in sharpening the edges of the knife or blade, for the purpose of severing it from its shell, and in a peculiar adjustable bed, in which the oyster is held, while its shell is being opened.

FEED WATER-HEATERS.—Lars. A. Olen, S. F., No. 332,824. Dated Dec. 22, 1885. This device for heating and purifying feed water to boilers consists of a boiler iron box at the rear

of the boiler, a second box or casing upon the first box, and containing return flues communicating with the pipe from the pump, said box or casing receiving the exhaust steam; a globe connected with one end of the first box and with a pipe from the flues of the second box, a globe connected with the other end of the first box, and with the pipe to the boiler; a cup or disk in the first globe to receive the feed water, and a valve outlet from said cup, a check-valve in the second globe, a perforated casing around said valve, and a screen cylinder around the casing, a discharge pipe from the globe, and other details of construction. The object is to provide a device adapted not only to heat the feed water, but at the same time to purify it, and which can easily be cleaned.

CAR TRUCK.—Wm. T. Brown, Stockton. No. 332,378. Dated Dec. 15, 1885. This consists in a main truck-frame centrally supported upon a pair of wheels, supplemental truck-frames upon its same level, each supported upon a pair of wheels on a central longitudinal line, equalizing bars extending along each side of the main truck-frame, having their proximate ends supported upon the boxes of the central pair of wheels and their outer end suspended by links in line directly above the axles of the supplemental truck wheels. The springs by which the truck frame is supported rests upon the equalizing bars at points in their length between their supporting end. The invention further consists in a means for suspending the outer ends of the equalizing bars so that they will act to allow the supplemental trucks to adjust themselves to the curves in the line of the road and to return to their normal position whenever such curves have been passed.

BARK-CUTTER.—John C. Hagerty, Santa Cruz. No. 332,797. Dated Dec. 22, 1885. The machine consists of a cylindrical drum rotating within a casing, which is provided with a chute or hopper, through which the bark is brought in contact with the periphery or face of the drum. Through the face of the drum slots are made, which communicate with chambers in its interior, these chambers having straight sides nearest the periphery of the drum to receive straight-bladed cutting knives, and are enlarged or curved at their rear inner portions, and which are at the same time inclined and spread or flared to open outwardly toward the end of the cylinder, so that the bark, which is cut off by the knives, as the cylinder rotates, will pass into the chambers and be thrown outwardly from them by the inclination and flare or funnel-shape of their inner rear portions. The bark will be discharged into the space between the side of the drum and the surrounding casing without being allowed to pass into the interior of the drum or around the shaft.

ELECTRICAL THERAPEUTICAL BELT.—Chas. N. West, S. F., No. 332,467. Dated Dec. 15, 1885. The invention has reference to electrical belts for therapeutical belts. It also relates to certain improvements in appendages for connecting the belts with certain parts and organs of the human body, by which the electric current is conducted from the belt and applied to those parts and organs. The first improvement applies to the construction and peculiar arrangement of the parts of the individual elements of the belt, by which these elements may be taken apart at pleasure and any of the parts exposed, so that they may be cleaned or renewed without breaking the electrical connection between these elements or in any manner require the reconstruction of any portion of the battery, or elements in the series constituting the belt; and it further relates to the manner of linking or connecting the elements together. The second improvement relates to the form and arrangement of the conductor for applying the electric current the organs of the body.

Winifred District, Arizona.

A few weeks since one of our correspondents mentioned that in one of California districts had been found the purest gold that had been found in quartz. W. L. Hastings, of Phoenix, Arizona, writes us, in reference to this statement, that he has in Winifred district, Arizona, taken out quartz that yields very pure gold, and sends us as evidence, the certificate of assay, by J. G. Trotter, of the assay office of the St. Louis and Yavapai M. & M. Co. The ore from the Lawrence mine, assayed by him, yielded at the rate of 5.712 ounces gold and .24 ounces of silver per ton. The value of the gold at \$20.67 per ounce, was \$118.07, and silver, at \$1 per ounce, .24; total, \$118.31. This shows the gold to be remarkably fine.

The ledge is not very large, being only 18 inches wide, and assays from \$76 per ton upward. The best mine in the district is the Union. It is considered a true fissure vein, is one and one half to four and one-half feet wide between the walls, and is all pay ore, as are the other ledges in the district. The ore works \$32 per ton. The formation is granite foot wall and slate hanging wall. The district is about four miles long and one mile wide. Our correspondent concludes, "I think the MINING AND SCIENTIFIC PRESS is a necessity to any miner, and I am always glad to get it. I show it to all my acquaintances and try to get them to subscribe."

A LIDA VALLEY correspondent says that the State Line mill is running steadily on ore.

MECHANICAL PROGRESS.

Mysterious Failures of Steel Plates.

A correspondent of the *Engineer* writes to that journal as follows:—The eccentricities of steel plates are again exciting the apprehensions of ship owners and shipbuilders in the North. A certain steel ship is at present under construction at a northeast coast shipyard. The plates are supplied by a company which have every appliance for making them well, and, as a matter of fact, they are all subjected to Lloyd's survey before leaving maker's works. The garboard, or keel strake, was duly bent, punched, countersunk, and, last of all, annealed in the usual manner, and then riveted to the ship frames. By the time the work was so far complete, however, three of the plates cracked in a mysterious manner, and became, of course, quite useless. After being cut strips were taken from the cracked parts of the cracked plates, and were tested in every conceivable way. It was thought that brittleness or inferiority of some kind would be detected. Not so, however, for the test pieces behaved in every way as they should do, and afforded no clue whatever to the solution of the difficulty. The replacement of three plates out of a strake is not of itself a very serious matter; but this uncertainty which remains as to the condition of the remainder, and, indeed, as to the condition of similar plates in similar ships everywhere is naturally a source of trouble and anxiety. A keel-strake plate cracking across, when a ship is at sea, might cause it to founder without any discovery of the reason why. If three plates of the highest attainable quality, and treated in the most skillful way, fail badly and suddenly after being secured in their places, and without any obvious strain upon them, why should not the same thing or worse occur when the unknown stresses occasioned by heavy seas try them perhaps to the utmost? There is obviously something yet to find out about steel plates. There appears to be an inherent uncertainty of behavior consequent on homogeneity. The very quality that enables steel to beat its competitor iron so easily and so decidedly in tensile strength and in ductility renders it also at certain times and in certain conditions as treacherous as glass. And those conditions, and how to provide against them, no one as yet seems fully to understand. If steel plates, like iron, would only show inferiority by obvious indications during manipulation, they could be submitted to the process of artificial selection. But like hypocritical individuals they always appear immaculate when undergoing observation, and alter their behavior suddenly and completely just when they have established their character for reliability. It is understood that further progress of the vessel in question has been delayed for the present, pending certain inquiries and investigations. As a natural consequence there is a tendency for iron as a ship building material again to come into favor with ship owners, and especially for sailing ships.

Reckoning the Cost of Steam Power.

A fair horse-power in a steam boiler is an evaporation of 30 pounds of water per hour, from a temperature of 212 degrees. Ten pounds of water evaporated from a temperature of 212 deg. for each pound of coal is very high economy. Six pounds is fair work, and above the average. Under the best conditions, a horse-power can be got from an evaporation of less than twenty pounds of water. Every owner of steam power should weigh the water evaporated in his boiler, and also the coal used to produce such an evaporation. A measure of some kind that will show the weight of feed water passing into a steam boiler with accuracy should be used with all boilers when economy is an object. It should be the duty of a fireman to know the weight of fuel used as well as the weight of water. No man has any right to find fault with the economy of his boiler until he knows the amount of water evaporated per hour, and the amount of coal used to produce the same.

The economy of an engine depends greatly upon its size; small engines are more wasteful than large ones; all the items of loss become proportionately greater as the size is decreased, and it is also more difficult to guard against waste with small engines than with large engines. With a good automatic, non-condensing engine, the coal required per horse-power per hour varies from 3 to 3½ or 4 pounds, according to the quality of the coal. A condensing engine of the automatic type, will go somewhat below these figures. Still better economical results than these may be obtained with higher rates of expansion, using a compound condensing engine of moderately large size, employing a steam jacket and adopting every means to prevent waste of heat; the consumption of coal may then be made to go as low as 1½ to 2 pounds per horse-power per hour; and future improvements may be expected to bring about even higher economy than this, which still falls far short of what is theoretically possible.—*Ex.*

AN IMPROVEMENT IN NAIL-MAKING.—It is said that an improved method of manufacturing a semi-wire nail will soon be put in use in some of the Pittsburgh mills, which will revolutionize the nail manufacture. By this method semi-wire nails of square section, boat, barge, track and railroad spikes, as well as the common cut

nails, can be made on the cut nail machines now in use without changing the manner of the operation. The improved cut nails will be of the same pattern and appearance as those now made, except that the inclined sides will be smooth and the parallel sides will be the cut or rough surfaces, thus increasing the adhesive or holding power of the nails. Semi-wire nails made by this method will be of square section, with four parallel sides and a chisel point, while the output will be at least three times that of the regular wire nail. The boat, barge, track and railroad spikes will have the same appearance as the most perfect now made from rods. The heads will not come off in driving, by vibration or extraction, and any shape of head can be produced. In addition to the increase of output, it is estimated that the improvement will save at least \$4 per ton on the labor cost in manufacturing nails and spikes. The only change involved will be a modification in the process of rolling the plates.

How to Learn.

What a mechanic needs most to-day is to know how to think. A man who can do this is never at fault for ways or means. He can meet any emergency. If a difficult job comes along, he rises to it and enjoys conquering the difficulty. He is an inventor. He invents hundreds of things every month of his life.

Such a man loves dearly to go on a tramp. He loves to go into every shop and factory and use his eyes. That man is a scholar. He is at school all the time. He has learned the one vital lesson and knowledge is his. Our man has learned how to learn. Not a shop does he enter, but something appears which he wishes to see. He learns a new kink while he is watching Bob light his pipe or set a lathe tool. He finds a treasure where Mike would see nothing but steel, scrap-iron and \$2 a day.

Perhaps our man has got half an idea as to some improvement to a machine. He is working up his odd minutes in perfecting his invention. As he walks through a shop he sees a jig for some peculiar job. It is nothing but a couple of screws and two pieces of iron, yet it suggests something, and his invention is perfected. Like a flash the mind catches the idea of what is wanted, yet the article which suggested it is no more like it than "elbow grease" is like "taper oil."

When you learn a trade or study a lesson, then learn how to think and how to catch new ideas. Learn this thing, and if you can do it the trade is yours.—*American Machinist.*

BOILER FLUES.—Steel flues were but very little used previous to 1870, and their use at present is not common. They are very thin, wear well in the hands of competent engineers, and with borax as a flux are readily pieced and rewelded to iron ends. It was stated by Mr. Setchel at the late meeting of the Master Mechanics' Association that he had used a few sets of steel flues, but with poor success, until he commenced using "safe ends," about six inches long, made from the very best of iron.

It is generally acknowledged that the flues constitute the most effective heating surface of the boiler, although there are some who dispute this. But the most common assumption is that the relative value of the flue and fire-box surfaces are as one to three. In a paper read before the late meeting of the Institute of Civil Engineers, it was stated that in the analysed work of 19 locomotive boilers the fire box evaporated one-fifth and the tubes four-fifths of the water. Brass or copper flues transmit heat more freely than steel; but it still remains a dispute whether the use of the more expensive metal can be made economical. The general use of iron or steel in preference seems to settle the question, although more careful experiments might throw additional light upon the subject.

CARE OF STEEL BOILERS.—Steel has been tried in numerous cases for locomotive boilers, and abandoned by some, because of the cracking of the sheets that form the fire box. If a boiler having a steel fire box is blown off and washed with cold water before allowing it to cool, the sheets will not crack. But if the boiler is washed out with hot water the sheets will generally crack. On an important railroad they were constantly troubled by cracked steel boilers while purifying the former plan, but since adopting the latter, not a single sheet has cracked. It is also an excellent method to bank the fires, and not let them go out, unless it is necessary to do work on the boilers. The boilers are thus kept free from the damaging and dangerous result occasioned by great and frequent changes of temperature.

HOT JOURNALS AND BOXES.—A contemporary says: There is one thing about journals and boxes that has not been spoken of very much, and that is the circulation of the oil in the box. If the oil circulates throughout the box there is less danger of heating. I have good results in babbiting boxes, especially solid boxes, by taking paper and placing around the shaft, and then taking stout string and tying around the paper in the form of a quick thread, letting the string go right and left. This has a tendency to cause the oil to circulate back and forth throughout the bearing, thoroughly lubricating every portion of the bearing. It is always better to have a box, especially a half box, to bear on the bottom and not on the two edges. A box that is cast or bored on a smaller circle than the shaft is sure to get hot.

SCIENTIFIC PROGRESS.

The Work of the Chemist.

This chemist is coming more and more to the front in the progress of the industrial arts. Nearly every department of industry—the architect, the manufacturer of textiles, the dyer, the workers in metals, and, perhaps, more than all, the agriculturist must kneel to the shrine of chemistry. The architect finds his work continually crumbling away, and he appeals to the chemist for means for its preservation; the manufacturer must have a more perfect knowledge of the nature of the fibres which lie at the foundation of his industry and he calls in the chemist and the microscopist; the dyer must learn the chemical reactions of his colors and their relations to the fibres with which he is required to deal. The workers in metals have, within the last two decades, through chemical investigations, more than quadrupled their power and efficiency in dealing with the stubborn minerals which it is their mission to transform from the unsightly masses in which they appear in nature to the elegant or useful designs and forms which they are made to assume for ornament or use. But perhaps the agriculturist, more than any other, is almost daily acquiring from this same source knowledge invaluable to his calling.

It is through this aid of sciences in all its various fields that the industries of the world have been able to make such wonderful advances during the present century. Science and the industrial arts must go hand in hand for all future time; in fact, science must lead, and should be encouraged in every way by governmental as well as individual effort.

THE PLANET SATURN.—This beautiful celestial orb is now in its most favorable position for observation, being at its nearest approach to the earth and having its rings at an angle at which they show to the best advantage. No one who has the opportunity should fail to improve the present position of that planet in observing and studying its complex system, especially the constitution of the dark spaces between his rings, and the shadowy markings on his disk. The features of this planet's surface are of extreme delicacy. The eye must be practiced, the instrument of the best kind, and the atmosphere clear to give any hope of reaching reliable results. Mr. Denning of Bristol, England, a close observer, gives an interesting report in *Nature* of observations that have been made upon the Saturnian belts during the last few oppositions.

A very definite narrow belt has bounded the southern side of the equator, remarkable for its compact appearance, though exhibiting no distinct spots. One or two observers have detected proofs of condensation. The belts near the pole are so faint that there is doubt if they have really been seen except by the eye of fancy. It is generally agreed that some of the features of the planet are variable, and this accounts for the difference of opinion among observers. Especially is this the case in regard to the division between the rings and the division in the outer ring. These must fluctuate at short intervals, or the evidence of different observers and different telescopes is strangely at variance. There is not much probability that definite results will be reached at the present opposition, even under such favorable conditions. None the less should the observation be thorough, close, and long-continued, for this is the only method by which terrestrial observers can hold communion with the other planets, or learn even the first lessons of what is going on in their distant domains. It is easy to recognize Saturn as he rises in the northeast about 6 o'clock in the evening.

ILLUSTRATING THE STEREOSCOPE.—A contributor to *Cosmos* suggests a curious optical experiment which may serve to show the principle of the stereoscope. If we cut out of black paper two similar figures—two crosses, for example—and place them, their extremities almost touching, at about three inches from the eyes, before a sheet of white paper, we shall see three crosses, the middle one being dark and completely separate. This phenomenon is explained by the simultaneous vision of the two eyes, and it is easy to show this by looking at the objects successively with one eye. The experiment becomes still more interesting when, instead of black figures, we employ complementary colors—red and green, for example. In this case we must use a dark background, and there will appear a white cross in the middle.

A NEW AND INGENUOUS GEOLOGICAL THEORY.—Geologists are very generally agreed in attributing to the action of glaciers an important part in determining the configuration of a large portion of the territory included within the United States; but Prof. J. P. Lesley, the present State Geologist of Pennsylvania, and late President of the American Association for the Advancement of Science, has advanced the curious and very ingenious theory that most of the topographical features of the Atlantic half of the United States, including the erosion of lakes Champlain and Ontario, and Georgian and Green bays, the Blue Grass country of Kentucky, the central basin of Tennessee, the great valley of Eastern Tennessee, Virginia, Pennsylvania and New Jersey, the Taconic valleys of Western New England, and the rich valleys of the interior parts of the Appalachian mountain

belt, have been due to the underground dissolution of the lower silurian limestone formations, and to the consequent breaking down of the palaeozoic roof above the caverns thus excavated, the process beginning, however, with the limestone of the carboniferous and sub carboniferous ages, being continued by the second subterranean erosion of the upper and lower Helderberg limestones, causing lakes Eris, Huron and Michigan, the smaller New York lakes, and the "poor valleys" of the Middle and Southern Atlantic States, and ending with the subterranean erosion of the Trenton and calciferous formations, which, in his opinion, is still going on.

THE FLOOD ROCK EXPLOSION.—Professor W. A. Rogers, of the Harvard observatory, has reported to the American Academy of Arts and Sciences, in Boston, the results of his observations on the transmission of shock from the Flood Rock explosion, which are quite interesting as showing the velocity of underground movements, and the distances from the center of disturbances at which they may be observed. The air line distance between the observatory in Cambridge and Flood Rock is 190 miles, and the observations were timed as follows: Disturbance first seen, 11:17:14; instant of maximum disturbance, 11:18:03; disturbance ceased, 11:20. The method used to develop the existence of vibration was the placing of a saucer of mercury on the solid cellar floor. In this mercury was a speck or flaw. Upon this point was brought to bear a microscope of 750 magnifying power, the spider line being in exact coincidence with the flaw. The first vibration perceived was about a thousandth of an inch, and recurred at intervals for nearly two minutes, the greatest swaying of the mercury being over a space of one five-hundredth of an inch. In this connection it is interesting to note that General Abbot reported that the shock from 50,000 pounds of dynamite exploded in 1876 at Hallett's Point, was transmitted through the drift formation of Long Island, at the rate of 5300 feet per second for 13½ miles. Assuming the figures of the Cambridge report as correct, and that the mine at Flood Rock was exploded at 11:14, seventy fifth meridian time, it took the wave just 194 seconds to travel 190 miles, or at the rate of 5120 feet per second. This is very near the rate of transmission observed by General Abbot, when the greatly increased distance is taken into account.

GELATINE DYNAMITE.—Mr. Alfred Nobel, the well-known inventor of dynamite and blasting gelatine, has improved upon those explosives by introducing what he terms gelatine-dynamite, which combines and gives effect to the qualities of the two great explosives that go to form its name. It has gone little further than the test stage as yet; but accounts of its use in mines, limestone and granite quarries, tunnels and collieries show that it has advantages that the intelligent workmen appreciate; that it does the work of dynamite in places that cannot be well ventilated; and that it leaves so little of an offensive smell that miners can go in almost immediately, feel no bad effects, and go right on with their work.

CAUTION TO AMATEUR ELECTRICIANS.—Certain printed instructions for the preparation of the chromic acid solution for batteries direct that the sulphuric acid be poured into hot solution of potassium dichromate; unless this be carefully done, small portions of the oil of vitriol may be projected into the face of the operator. Bunsen's method is preferable; mix the dichromate, in granular form, with the sulphuric acid, then add cold water, with continued stirring; the union of the acid and water generates sufficient heat to speedily effect the solution of the salt.

ASTRONOMICAL PHOTOGRAPHY.—To such a degree of perfection and effectiveness has astronomical photography been carried that the Messrs. Henry of the Paris observatory have recently obtained a photograph of the cluster in Perseus, showing stars down to the thirteenth magnitude. The negative was obtained in fifty minutes with a 6.3-inch object glass of 83-inch focal length. It has been enlarged four times, and reproduced by helio-engraving.

A NEW EASILY FUSIBLE ALLOY.—*Nature* gives the formula of a new alloy, which is specially adapted to many important uses in the arts. It melts at the low temperature of 160 degrees F., the temperature of moderately hot water, and considerably below that at which the magic spoons of long ago melted in a cup of tea. Its composition is: Bismuth, 48; cadmium, 13; lead, 19; tin, 20. This new alloy will withstand quite a severe pressure.

THE GULF STREAM.—From recent observations Captain Pillsbury finds that the strength of current of the Gulf Stream is invariably on the Florida, instead of the Bahama side of the stream. He has found the temperature of the stream to range from 42 to 81 degrees. The greatest velocity of the stream at the surface is about four and a half knots, but the fluctuations are frequent and great.

ALVAN CLARK HONORED.—The Czar of Russia has bestowed upon Alvan Clark of Cambridge, Mass., the golden honorary medal of the empire "in acknowledgment of the excellent performances of the great object glass" made by Mr. Clark for the chief telescope of the Pulkowa observatory. This medal is given very rarely, and only for extraordinary merits.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, Jan. 9, 1886.

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Passing Events.

The most notable event in connection with mining matters now being discussed is the new and rich discovery of silver carbonates on Carbonate Hill, just out of the city limits of Leadville, Col. The drifts show that the "blanket vein" is two acres in extent, yielding \$20 per ton, and it is estimated that the deposit will yield from \$4,000,000 to \$6,000,000.

Fresno county mining interests are looking up satisfactorily and this summer a great deal of work will be done.

The statistics of production of precious metals for the year 1885, just published, show that California still keeps second place as she has for many years.

Deeper explorations are being made on the Comstock, and great hopes are entertained of meeting another big bonanza.

The silver question is being discussed in Congress. From present appearances the bullion-producing regions can rest content that silver will not be demonetized.

THE MINERS' SIDE of the debris question has been taken in a memorial to the Secretary of War. We shall publish the memorial in full in the next number of the PRESS.

GENERAL CROOK is to be superseded in Arizona by General Miles.

Running Cable Roads.

Experience in San Francisco and on the Brooklyn Bridge.

In the discussion now going on in the East on papers of the question as to whether the Brooklyn Bridge management are using the best, latest and most improved gripping, brake and other mechanical appliances for the safe and efficient operation of that cable railway, it is evident that there is a lack of information on the subject, and especially as regards San Francisco cable roads. In a letter a short time ago, referring to the matter, a well known engineer says: "The requirements of a grip for the Brooklyn Bridge are much greater than on any other cable road in existence," and in the *American Machinist* of December 26th Mr. Chas. T. Porter says the requirements of the Bridge traffic are very severe. The idea is given that the requirements are more severe than ever before encountered. This is a mistake and evidently made without a knowledge of the facts.

Mr. Martin, chief engineer of the Bridge, is also quoted as saying that Paine's grip is now in use by a cable road in San Francisco, under license from Col. Paine. Mr. Martin must refer to the Sutter street road, as that company is the only one in San Francisco that ever took out a license from Col. Paine. The facts are as follows: The Sutter street road was opened as a cable road late in the summer of 1876, using Hovey's lever grip, but with Paine's combination of grip rollers and brakes on the same instead of solid jaws. The grades on that road are only seven per cent, but a great deal of trouble was experienced with that grip. The rollers operated like a rolling mill, and lengthened the cable rapidly by the great pressure required being confined to a small surface, and also broke up the surface wires rapidly. When the loads were large the gripman could not exert force enough on the lever to prevent slipping of the cable through the grip. In less than six months from the time the road was opened as a cable road, all of Col. Paine's brake rollers had gone to the scrap heap, and none has ever been used on that road or any other in San Francisco since that time.

We are not in possession of exact figures for the weight of the cars now used on the bridge, but will assume it to be 25,000 pounds each. Assume an additional standing capacity for passengers of four times the seating capacity, which, if we remember aright, is 44, making a total capacity of 220 passengers per car. This, at 125 pounds each, will make the total weight of passengers 27,500 pounds, and of the cars fully loaded 52,500 pounds. Assuming the friction to be 40 pounds per ton, the resistance due to friction would be 1050 pounds, and that due to the grade of three and a half per cent would be about 1575 pounds, a total of 2625 pounds total resistance for one car fully loaded ascending the steepest grade on Brooklyn bridge. The figures are not exact, but are not far from the truth. Now let us compare this with one of the hill roads in San Francisco—say the one on California street.

The grade on this line from Dupont to Stockton streets is 18.2 per cent, and on the next block but slightly less. The car and dummy used on that road weigh something over 8500 pounds. Sixty passengers is not an unusual load (110 having been carried up that grade at one load), which, at 125 pounds each, would make the total weight of loaded car and dummy 16,000 pounds. Such a load can be found every day, about six o'clock in the evening. The resistance due to friction, at the rate of 40 pounds per ton, as before, would be 360 pounds. The resistance due to the left on a grade of 18.2 per cent is about two-elevenths of the total weight, equal to 2900, making the total resistance 3260 pounds, which is considerably greater than that encountered on the Bridge. Yet the grips give no trouble, and there is no possibility of the cable slipping out of the grip on the grade, and one cable has run more than 22 months on this line. It is frequently necessary to stop on that grade, but the car is held securely, by means of the rail safety-brake, which is free from all complication; but if the ascending car is stopped by any obstruction, they are required to back down to the crossing of the street below, before starting, to avoid damaging the cable. On the Clay Street Hill road, near by, the grades are about the same, but the cars are not quite so

heavy. The Clay street was the first cable road ever constructed, and has been in operation more than 12 years. The Sutter street cable road has been in operation nine years, the California street nearly eight years, Geary street cable road six, Union street cable road five, and the Market street road, which is through the most important and busy street in San Francisco, about two years and four months. The safety rail brake is conceded essential to all roads having steep grades, and is used by all the cable roads here except the Geary street.

We are aware that it is much more severe on the cable starting a load of 52,000 than 16,000 pounds under the same conditions, but the Bridge cars always make the start at the same places, and only have to start twice on a round trip, and it would be an easy matter to make the track down-grade in the direction of the travel for a distance of 50 or 75 feet at the starting places; while on the Market street road of San Francisco, cars are required to stop anywhere a passenger may desire to get on or off, so a car frequently makes forty stops and starts to each round trip, and half of them on some up-grade.

There is no trouble for any experienced gripman starting without any severe shock, but they must start quickly to make the time between terminal points with the large number of stops for passengers they are required to make. On the branches of the Market street road leading to the park the grades are 12 3/10 per cent. The cars weigh 10,000 pounds each, and bays carried up that grade as high as 151 passengers, making a total weight of over 28,000 pounds. The cars are only two minutes apart on Sunday, and the average load of all the cars going up the grade for an hour, by actual count, was 116 passengers.

It is frequently necessary to stop on these grades, and if these cars had to depend on wheel brakes alone, collisions would be frequent, as a car will slide down such a grade on a slippery track with all the wheels locked, when once in motion, so the safety brakes are a necessity.

There is another feature of the Bridge arrangement that cannot be too severely condemned as being unhandy and dangerous. That is, the hitching of the grip and brake together on the same operating mechanism so that the wheel brakes even cannot be applied until the grip is released. The brakes should be entirely separate from the grip operating mechanism, and a lever is preferable to any hand-wheel and brake-staff when a man is excited, for the reason that the motion required to apply the brakes by means of a lever is quick, direct and unmistakable, far more so than can be obtained by any other motion.

If these gripping and brake devices used on the San Francisco roads were new and untried, or only existed on paper, the case would be entirely different, but after from six to twelve years of constant every-day use of these devices on six roads in San Francisco, on grades more than five times as heavy as those on the bridge, and one of these roads has carried over 70,000 passengers in one day, the actions of the Bridge Trustees committee in establishing an office for the purpose of testing and passing upon the merits of such grips as may be presented, must have been taken without a full knowledge of the state of the art. It must be apparent to any practical man like those on that committee that any office test is of little value, as compared with that of every-day use through a period of several years.

The arrangements for handling the cable at the engine-house in emergencies appear to be far behind the times, from the fact that it takes nine or ten hours to put in a piece of strand.

There appears to be no provision made for extra cable between the drivers and shifting tightener to be used for re-splicing in case the cable is damaged. All these things cannot be changed at once, but it does seem as if this should be managed as a business proposition, instead of wasting time with crank inventions and their devices that have been tried and discarded elsewhere years ago.

PLACER AND LOBE CLAIMS.—An item this week in the daily papers concerning the Good Return placer claim, speaks of annual expenditure being required on placer as well as on lode claims. The subject was very fully discussed, and the decision referred to given in detail in the MINING AND SCIENTIFIC PRESS last week.

Precious Metal Product of 1885.

The following is a copy of the annual statement by John J. Valentine, Vice-President and General Manager of Wells, Fargo & Co., of precious metals produced in the States and Territories west of the Missouri river, including British Columbia, and receipts by express from the west coast States of Mexico, during 1885, which shows aggregate products as follows: Gold, \$27,290,294; silver, \$46,489,939; copper, \$7,838,036; lead, \$8,562,991; total gross result, \$90,181,260.

As stated hitherto, the facilities afforded for the transportation of bullion, ores and base metals, by the extension of railroads into mining districts, increase the difficulty of verifying the reports of the products from several important localities, and the general tendency is to aggregation when the actual values are not obtainable from authentic sources, but the aggregate result, as shown herein, we think, may be relied on with reasonable confidence as approximately correct.

States and Territories.	Gold Dust and Bullion by Express.	Silver Bullion by Express.	Ores and Base Bullion by Freight.	Total.
California.....	\$11,750,400	\$1,608,100	\$16,026,712	\$29,385,212
Nevada.....	1,839,325	6,070,400	6,213,121	14,122,846
Oregon.....	350,637	56,468	109,660	511,765
Washington.....	72,760	38,310	109,660	220,730
Alaska.....	215,000	20,000	221,000	456,000
Idaho.....	9,062,446	807,410	2,510,000	12,382,856
Montana.....	2,091,000	6,317,412	14,254,112	22,662,524
Utah.....	3,838,362	8,096,734	8,291,912	20,226,008
Colorado.....	2,085,000	3,024,424	13,035,000	18,144,424
New Mexico.....	1,201,000	1,107,627	2,433,617	4,742,244
Arizona.....	736,436	1,750,685	2,906,682	5,393,803
Dakota (West Coast).....	2,600,633	120,000	2,720,633	5,441,266
British Columbia.....	483,383	1,953,340	20,000	2,436,723
Total.....	\$29,967,890	\$29,300,311	\$85,731,711	\$90,181,260

The gross yield of 1885, shown above, segregated, is approximately as follows:

	Per cent.	Amount.
Gold.....	30.36	\$27,290,294
Silver.....	51.55	46,489,939
Copper.....	8.61	7,838,036
Lead.....	9.50	8,562,991
Total.....		\$90,181,260

Annual Products of Lead, Copper, Silver and Gold in the States and Territories West of the Missouri River, 1870-1885.

Year.	Product as reported by W. F. & Co., including amounts from British Columbia and west coast of Mexico.	Product after deducting amounts from British Columbia and west coast of Mexico.	Lead.	Copper.	Silver.	Gold.
1870.....	\$54,000,000	\$21,150,000	\$1,000,000	\$1,000,000	\$1,000,000	\$33,750,000
1871.....	68,284,000	25,784,000	1,200,000	1,200,000	1,200,000	38,784,000
1872.....	62,236,000	23,931,834	1,100,000	1,100,000	1,100,000	36,136,834
1873.....	72,938,000	28,428,000	1,300,000	1,300,000	1,300,000	40,338,000
1874.....	74,401,045	29,401,045	1,400,000	1,400,000	1,400,000	41,601,045
1875.....	80,880,000	31,685,000	1,500,000	1,500,000	1,500,000	43,885,000
1876.....	80,880,000	31,685,000	1,500,000	1,500,000	1,500,000	43,885,000
1877.....	87,210,433	34,710,433	1,600,000	1,600,000	1,600,000	46,910,433
1878.....	93,121,734	37,241,734	1,700,000	1,700,000	1,700,000	49,441,734
1879.....	93,121,734	37,241,734	1,700,000	1,700,000	1,700,000	49,441,734
1880.....	100,107,893	40,107,893	1,800,000	1,800,000	1,800,000	52,507,893
1881.....	81,604,417	32,604,417	1,600,000	1,600,000	1,600,000	44,404,417
1882.....	81,188,474	32,188,474	1,500,000	1,500,000	1,500,000	44,188,474
1883.....	89,407,649	35,407,649	1,600,000	1,600,000	1,600,000	46,807,649
1884.....	92,411,885	36,411,885	1,600,000	1,600,000	1,600,000	46,811,885
1885.....	90,312,012	35,312,012	1,500,000	1,500,000	1,500,000	45,312,012
Total.....	\$849,912,200	\$349,912,200	\$18,000,000	\$18,000,000	\$18,000,000	\$450,912,200

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, \$36,979,720; from Marseilles, \$1,067,220; from Venice, \$726,000; from San Francisco, \$17,337,000. Total, \$56,109,949, as against \$55,617,578 last year. Pounds sterling estimated at \$4.84.

Drainage of Water Level in Coal Mines.

A work on coal mining, by Thos. H. Walton, has recently been issued by Henry Carey Baird & Co., a copy of which we have received from A. L. Bancroft & Co., of this city. There are many large and elaborate plates after actual workings and apparatus, and several wood engravings, in the book, and the text is novel from its "practical" character, science and mathematics having been set aside in favor of practical details. Some of the descriptions are carried out by imaginary dialogues between workmen, foremen, etc. We quote one of these dialogues on the subject of the proper method of cutting the gutter or drain in the water level of a coal mine.

"Bill, would it not be better to have the gutter on the upper side of the track; cut away into the bottom slate for instance?"

"That is what I have never seen before," growls Bill; "it seems unnatural to have the gutter on the high side."

"But which is the high side?" asks Harry. "For my part, the gutter being placed in this manner in the bottom slate at the lowest point would be literally in the lowest side, and I would call it the low side. Here we have it," and Harry draws a sketch and discusses its merits (Fig. 1).

"Now here is your old gutter in the coal at A. Here is the gutter to be cut out of the bottom rock at B, and so deeply into it as to be used as a water course after this lift has been abandoned and worked off."

"What use would it be then?" asks Bill, bluntly.

"Don't you see it would collect all the water coming over the bottom slate from the surface and pass it off without hothering the pumps of our lower lifts, after the workings of the lower levels fall through or are driven into this water level gangway?"

"But look at the extra expense of cutting the gutter in the rock; it would cost an additional two or three dollars per yard. And then what will it matter to us or our owners; we may be, God knows where, when the lower lifts are worked."

"Now, Bill, look here!" interrupts Harry. "If this were my property, and you were a lessee, you would not extract a pound of the coal from this water level unless you agreed to build a permanent water course as you progressed with your water level mining. I should not be so green as to lease any of my property to be ruined by any parties who would not lease with a clause inserted to bind them to such an arrangement. Look at that gutter! it is flooded. There are not less than three hundred gallons of water per minute delivered by that shabby little drain of yours. Now when this coal is worked below us—which it will be within a dozen years of this time—that water will be pumped up from the next lift, and then, after that, from the deeper lifts second and third, and Heaven only knows how far it will run down into the mines when they are opened below us in after years."

"Yes! but how would you build and support this permanent water level?" asks Bill, in a tone of assurance.

"By driving the whole gangway into the bottom rock, and by securing it with timber set up in the 'jugglar' fashion, according to Fig. 2. By using packing behind the legs in the manner represented, after a portion of the solid coal has been removed, we should avoid the serious crash which comes on timber which is wedged up against it with nothing intervening to mitigate the immense strain. Besides forming a permanent water level, it would form a permanent gangway, which is more desirable still, as it would not require relief timbers. Stumps of coal would not be required above the gangway. Then look at the room we have for a monkey gangway to use an air-course either in the position shown at A or at B (Fig. 2); a single prop would suffice at A and double timbers at B. In addition to these advantages we could work the breasts of our lower lifts clear up in this level and cause it to suffer no injury."

After Bill examines the sketches which Harry has drawn in his dirty time book, he ventures to ask concerning the cost of such a gangway.

"With the use of a compressed air drill," says Harry, "I could drive such a gangway for \$20 per lineal yard, which is less than this our present gangway will swallow up before it is finished, after it has been supplied with its sets of relief timbers, besides other repairs. In addition we would be able to get about 100 tons per yard more before we robbed any of the pillars."

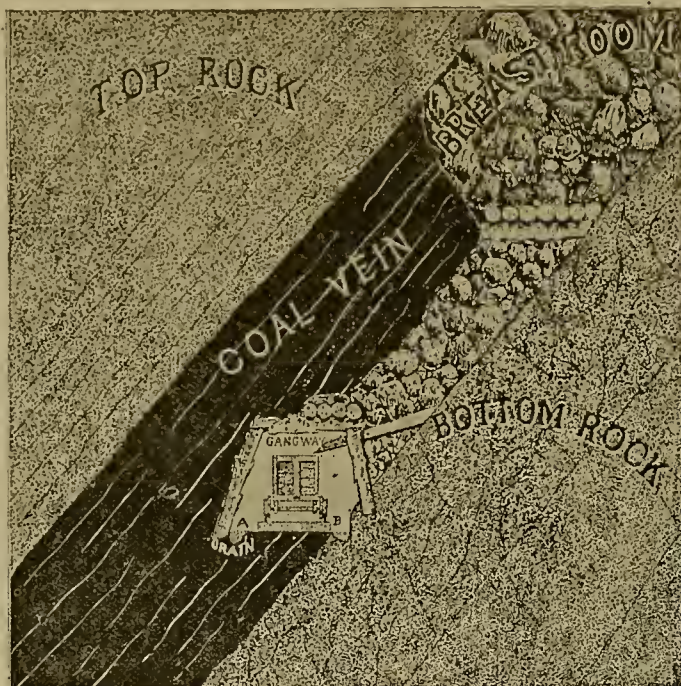
"I do not see how we can do that," says Bill. "I have just told you I would not leave the stumps above the gangway of this lift. I would drive my chutes to the top slate and open the breast close to the upper edge of the gangway, and thus have the benefit of 24 feet of breast more than I have. Then in the next lift below I would drive the breasts entirely up to this gangway and take advantage of the rock passage for an air-course."

"That would certainly be a great advantage to the people of the lower lifts. It would drain off the light gases they will have. Look, here are a number of gas bubbles escaping at all times in this place," says Bill, with a little more of grace in his tone. And he takes his lamp and puts the flame into contact with the

escaping bubbles, and lo! a little blue flame shoots out of the gutter as the bubbles burst. "I bet they will have a hot shop down in that quarter of the mine when they come to open it out," chuckles Bill, in a manner indicating that he will not be of the party which is to contend against the gases in the lower levels of the mines.

"All right, Bill, I have just been fooling you into a better temper: we shall not drive the gangway into the bottom rock. The people here will think us crazy if we propose such a plan, and we are not the land-owners, nor are our employers anything but lessees of very short

Fig. 1.



THE DRAIN-WAY MADE IN THE COAL.

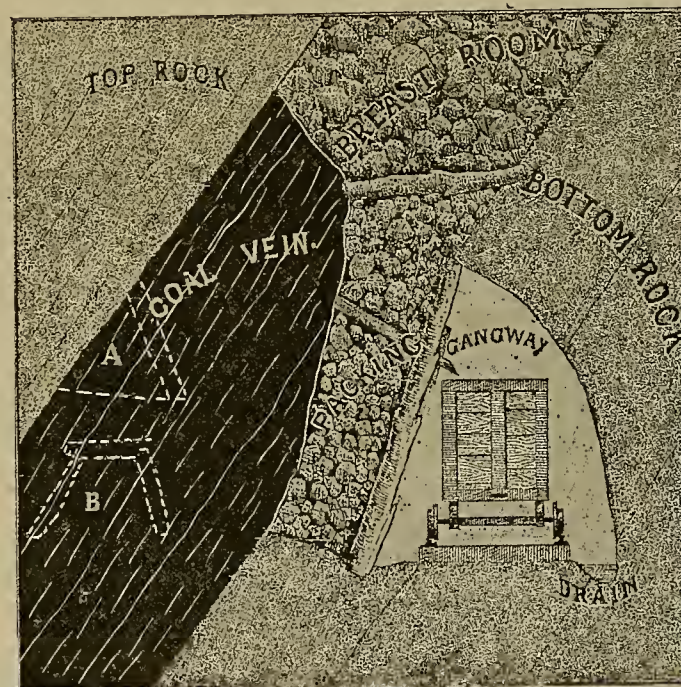
duration, unfortunately for themselves and the land-owners, too?"

"We will go on and get to No. 8 and see if this scientific man has any suggestions to make about the air-current. He has told us not a word of the subject of drainage, nor of my proposed method of working a water level. I con-

in a horribly mutilated condition. He was a native of Cornwall, about forty-five years of age, and leaves a wife and three children.

On Monday John Livingston found Thomas Lee, an old miner of the vicinity, in a mining claim on Knapp's ranch not far from Columbia,

Fig. 2.



DRAINING WHERE GANGWAY IS CUT IN THE ROCK.

clude they are subjects above his science," says Harry, in tones of pretended sarcasm.

"I can find not the shadow of a fault with the remarks you have made," you say. "Bill has suggested the great idea of using the road you have proposed to make as an air-course, which gives your water-course a double capacity. I have given you both great credit for your respective suggestions, and I shall take the first opportunity of sounding your praises."

HOMES FOR CHILDREN WANTED.—We are requested to say that boys and girls may be had—particularly boys—for service at wages, for indenture or for legal adoption, by applying with recommendations to E. T. Dooley, Supt. Boys and Girls' Aid Society, 68 Clementina St., San Francisco.

Mining Accidents.

On Tuesday last a fatal accident occurred in the Eureka mine, on Ruby Hill, Eureka District, Nev. William Peters, while running a carload of waste rock from the workings on the third level of the station there, to have it hoisted to the surface, ran it into the shaft. Both man and car fell to the bottom of the shaft, a distance of over 500 feet. The remains of the unfortunate man were found shortly afterward

not commenced until the next morning, when the body was extricated.

Last week Ormshee Groom, a well-known miner, working in the Valley View mine, near the town of Chloride, Arizona, fell down the shaft and was killed. The shaft in which the accident occurred is on an incline of about 45 degrees, the drift being some 35 feet from the surface. Labrosse says that he was sitting in the drift, about two feet from the shaft, waiting for the bucket to come down, and hearing a noise, looked up the shaft and saw Groom plunging down head foremost, the latter being about five feet above the drift when Labrosse first caught sight of him.

Roscoelite and Vanadate of Lead.

In last week's PRESS mention was made of the mineral vanadate of lead, a large deposit of which is said to have been found in Montana, and worth \$10,000 per pound. We stated that, though the mineral was very rare, and a small quantity might bring a high price as a specimen, no such figure as that mentioned could be obtained. Its main value lay in the vanadic acid it contained, which is valuable as a mordant in dyeing.

As further proof of the statement we made as to value, an instance may be cited. Roscoelite, which is vanadic oxide, was named for Prof. Roscoe, who first isolated vanadium. The mineral has been discovered, thus far, in California only. A short time since a large deposit of gold dust was received by Prof. Price, of this city, mixed, so the correspondent said, with a base material. An examination of this "base" proved it to be Roscoelite. Some of this Prof. Price shipped to England, but could make no market for it.

Attention was first called to the mineral Roscoelite in a paper by James Blake, at a meeting of the San Francisco Microscopical Society. The specimens were from near Coloma, El Dorado county, in this State. The same gentleman also presented specimens to the California Academy of Sciences, from Granite Creek, same county. He sent samples to Dr. Genth, of Philadelphia, who found the mineral to contain vanadium. An analysis was made by Prof. S. H. Roscoe, of Owen's College, Manchester, England, as follows:

Silica	41.25
Vanadic acid (V ₂ O ₅)	23.60
Alumina	12.84
Sesquioxide of iron	1.13
Oxide of Manganese	1.10
Lime	.61
Magnesia	2.01
Potash	8.56
Soda	.82
Water combined	1.08
Moisture	2.27

In the State Mineralogist's second annual report this mineral is described, and in the fourth report there is still fuller reference to it. The main point in this connection, however, is the fact of the large percentage of vanadic acid it contains which is supposed to give the high value to vanadate of lead. As it was not salable in England, it is hardly probable that any \$10,000 a pound would be given for vanadate of lead.

Moreover, Montana is not alone in possessing vanadate of lead. Prof. Wm. P. Blake found it at Castle Dome District, Arizona, just beyond the line of this State, across the Colorado. It occurs in considerable abundance in the Railroad claim there. It has also been found in Crystal District, in the Hamburg mine. These specimens were found as long ago as 1880, and were described by Prof. Blake at the time. A complete description of the vanadates of lead of the Castle Dome mines will be found in the State Mineralogist's second annual report.

Annual Mining Review.

On the 23rd inst. we shall publish in the MINING AND SCIENTIFIC PRESS our usual annual review of mines and mining. We are gathering very full statistics and information for this double number of the PRESS, which will be filled with matter of interest to the mining community. We shall be glad to have any of our readers in the various camps send us such information as they have concerning progress and condition. These letters we will receive with pleasure. Send us the news, and we will put it in shape. This review will embrace in its scope not only this State, but Nevada, Oregon, Washington, Arizona, New Mexico, Utah, Idaho, Montana and Colorado. It will show the condition of the mining industry and the results of last year's work.

PRACTICAL HYDRAULICS.

NUMBER 12. COPYRIGHTED.

PRINCIPLES OF HYDRAULICS.

Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

By Table 6, square root of head $\sqrt{9.06}=3.01$ nearly.By Rule 27, $Q=.900 \times 8.025 \times .1963 \times 3.01=4.27$ cubic feet.—Ans.

Divergent Tubes.—Experiments show that the flow of water through a short divergent tube is similar to that in a thin plate. The coefficients of which are given in Table 9. In ordinary practice .62 is employed.

In case a vacuum is formed in a divergent tube, the flow is greatly increased, so that it may then even exceed the theoretical flow due the force of gravity, through an orifice in a thin plate, whose diameter is equal to that of the smaller diameter of the divergent tube; in other words, its coefficient of flow becomes greater than unity. The conditions effecting this result are a high velocity of flow in a tube of small divergence, and whose length is several times its smaller diameter. Thus, the smaller diameter of a divergent tube being 1.32 inches, the length 9 times this diameter—11.88 inches, the included angle of the tube equal to $5^\circ 6'$, and the head of water 2.89 feet. Venturi found the coefficient of flow equal to 1.46, or 2.4 times that of an equal orifice in a thin plate. If the entry end of an otherwise similar tube be bell-mouthed in form, the coefficient of flow estimated for smaller diameter will evidently exceed that obtained by Venturi. The principle of the formation of a vacuum by flowing water at a high rate of velocity, through a divergent tube, and thereby greatly increasing the volume of discharge, was known to the ancients. D'Aubuisson states that the application of the principle, at a distance less than 52.5 feet from the public conduits, by Roman citizens having grants of water, was prohibited by Roman law.

TABLE 14.

Coefficients of the flow of water through divergent tubes.

Angle.	Length of Tube, Feet.	Coefficient.	Angle.	Length of Tube, Feet.	Coefficient.
$3^\circ 30'$	0.364	0.93	$5^\circ 44'$	.193	.82
$4^\circ 38'$	1.095	1.21	$10^\circ 16'$	.865	.91
$4^\circ 38'$	1.508	1.21	$10^\circ 16'$	.147	.91
$4^\circ 38'$	1.508	1.34	$14^\circ 14'$	.147	.61
$5^\circ 44'$	0.57	1.02			

Ex. 60.—In a divergent tube the smaller diameter being .61 of an inch, the length 1.508 feet, the angle included between its sides $4^\circ 38'$, and the head on center 2.89 feet, what is the volume of flow in cubic feet or 24 hours?

Cal.—Diameter .61 inches—.0508 feet.

By Table 14, mean coefficient of discharge $(1.21 + .34) \div 2 = 1.275$.

Area of cross-section of tube, $.0508 \times .0508 \times .7854 = .002027$ square feet.

By Table 6, square root of head $\sqrt{2.89}=1.7$.

By Rule 27, volume of discharge per second.

$Q=1.275 \times 8.025 \times .002027 \times 1.7=.03525$.

In 24 hours are 86,400 seconds; hence, $.03525 \times 86400=3046.05$ cubic feet.—Ans.

Ex. 61.—In a compound tube, Fig. 18, the cylindrical part, P, is .0853 feet in diameter, 2.0605 feet in length; the convergent part, C, .2559 feet long; the divergent part, D, .7667 feet in length; and the head 2.3642 feet. What will be the discharge in 10 hours?

Cal.—By Table 15, the coefficient of flow due to P D=.905.

Compound Tubes.—Compound tubes are of various forms. Eytelvine, as stated by J. T. Fanning, after experimenting with cylindrical tubes of uniform diameter and different lengths, placed between them and the reservoir, convergent tubes of the form of the contracted vein, and renewed the experiments; these added to the discharge end a divergent tube with $5^\circ 6'$ angle. Fig. 18.

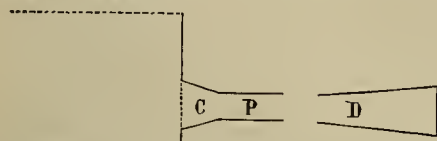


FIG. 18.

In Fig. 18, C represents the conically convergent part of the tube of the form of the contracted vein; the cylindrical part of uniform diameter, but of different lengths, and the conically divergent part

with $5^\circ 6'$ angle. The results obtained are given in the following table:

TABLE 15.

Coefficients of the flow of water through compound tubes.

Head, Feet.	Diameter of P, Feet.	Length of P in Feet.	Length of P in Feet.	Coefficient for P.	Coefficient for C P.	Coefficient for C P D.
2.3642	0.0853	0.038	0.0033	0.62	.....	.....
2.3642	0.0853	1.000	0.0853	.62	.967	.....
2.3642	0.0853	3.000	0.2559	.82	.943	1.107
2.3642	0.0853	12.077	1.0302	.77	.870	.978
2.3642	0.0853	24.156	2.0605	.73	.803	.905
2.3642	0.0853	36.233	3.0907	.68	.741	.836
2.3642	0.0853	48.272	4.1176	.63	.687	.762
2.3642	0.0853	60.116	5.1479	.60	.648	.702

Area of cross-section of tube P, $.0853 \times .0853 \times .7854=.005761$ square feet.

By Table 6, the square root of head $\sqrt{2.3642}=1.54$ nearly.

By Rule 27, $Q=.905 \times 8.025 \times .0057 \times 1.54=.06367$ cubic feet per second.

In 10 hours are $3600 \times 10=36,000$ seconds; hence, $.06367 \times 36000=2292.07$ cubic feet.—Ans.

Divergent and Compound Tubes.—These tubes seldom find a place in practice. The lessons, however, which they teach, are of interest, and serve to stimulate the vigilance of the engineer, lest irregularities occurring from design or otherwise, shall elude his observation in matters of importance.

Flow of Water Through Pipes.

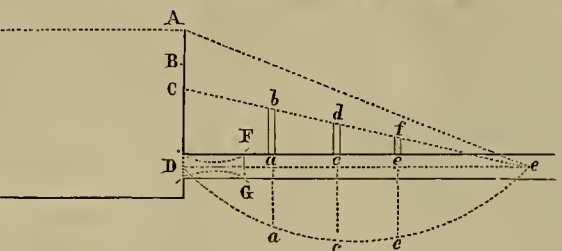


FIG. 19.

The flow of water through a pipe is estimated to begin at a point where the stream, after contraction, expands so as to fill the pipe, as at F G, Fig. 19.

The part, D F G, performing the office of a short tube, is, as hereinbefore shown, from 2.6 to 3 times the diameter of the pipe.

The total head, A D, consists of three parts: A B, which generates the velocity; B C, which overcomes the resistance of entry; and C D, which overcomes all resistances in the pipe, F G E. C E is termed the hydraulic gradient, and is such, if the pipe is running full, the water will rise to this grade through tubes, as a b, c d and e f.

Short and Long Pipes.—A pipe, exclusive of the tube portion described, in case its length does not exceed a thousand times its diameter, is termed a *short pipe*, and in case its length exceeds a thousand times its diameter, is termed a *long pipe*.

Let, in Fig. 19:

$h=A D$, the total head.

$h_v=A B$, the velocity head, or head necessary to generate the velocity v .

$h=B C$, the entry head, or head necessary to overcome the resistances of entry.

$h_i=h_v+h_e=A C$, the inlet head, or head necessary to generate the velocity, v , in the pipe, and to overcome the resistances of entry.

$h_f=C D$, the head necessary to overcome the resistances within the pipe.

v =the measured velocity of discharge.

v_i =the theoretical velocity due the head $h_i=A C$.

c =the coefficient of flow in a short tube (length to diameter as 3 to 1), as determined by experiment.

$c_v=C$, the coefficient of velocity, as the stream, after contraction, fills the pipe.

c_e =the coefficient of entry.

c_f =a variable coefficient for the resistances within pipes, as determined by experiment.

d =internal diameter of pipe.

p =perimeter or internal contour of pipe.

a =area of cross-section of pipe.

l =length of pipe.

s =size of slope.

r =hydraulic mean radius.

f =amount of resistances to flow in the pipe.

w =weight of water discharged during the time of resistance to its flow.

Then there results:

$$\text{Equation of total head, } h=h_v+h_e+h_f. \quad (108)$$

$$\text{Equation of entry head, } h_e=h_i-h_v. \quad (109)$$

$$\text{By equation (8), velocity head, } h_v=\frac{v^2}{2g}. \quad (110)$$

$$\text{By equation (8), inlet head, } h_i=\frac{v_i^2}{2g}. \quad (111)$$

Equation of theoretical velocity due inlet head,

$$v_i=\frac{v}{c_v}. \quad (112)$$

Substituting the value of v_i of (112) in (111),

$$h_i=\frac{v^2}{2g c_v^2}. \quad (113)$$

Substituting the values of h_i of (113), and of h_v of (110) in (109),

$$h_e=\left\{\frac{1}{c_v^2}-1\right\}\frac{v^2}{2g}. \quad (114)$$

$$\text{Putting } c_e=\left\{\frac{1}{c_v^2}-1\right\}. \quad (115)$$

Substituting c_e for $\left\{\frac{1}{c_v^2}-1\right\}$ in (114),

$$h_e=\frac{c_e v^2}{2g}. \quad (116)$$

The work performed by the weight, w , falling vertically by the force of gravity through the distance, h_f , in one second, is

$$F=w h_f, \text{ "foot pounds."} \quad (117)$$

Experiments show that the amount of resistances occurring from friction of the internal surfaces of a pipe, and from other causes, varies nearly as the square of the velocity, v .

Experiments also show that the amount of resistances increases directly as the length, l , of the pipe, and inversely as its diameter, d , or hydraulic mean

$$\text{radius, } r=\frac{a}{p}.$$

The work performed by the force of gravity, in overcoming these resistances, so as to effect the discharge of the weight, w , of water with the velocity, v , per second, as first proposed by Chezy, and subsequently adopted by most authors on hydraulics, is

$$F=\frac{w c_f p l h_e}{a} \text{ "foot pounds,"} \quad (118)$$

in which c_f is a variable coefficient whose values are determined by experiment.

Substituting the value of $h_e=\frac{v^2}{2g}$ of (116) in (118), equations (117) and (118),

$$w h_f=\frac{w c_f p l v^2}{2g a}. \quad (119)$$

$$\text{Dividing (119) by } w, h_f=\frac{c_f p l v^2}{2g a}. \quad (120)$$

Substituting the values of h_v of (110), h_e of (116), and h_f of 120, in (108),

$$h=\left\{\frac{v^2}{2g}+\frac{c_e v^2}{2g}+\frac{c_f p l v^2}{2g a}\right\}. \quad (121)$$

$$\text{Factoring (121), } h=\left\{1+c_e+\frac{c_f p l}{a}\right\}\frac{v^2}{2g}. \quad (122)$$

Transposing (122) with respect to v ,

$$v=\left\{\frac{2gh}{1+c_e+\frac{c_f p l}{a}}\right\}^{\frac{1}{2}}. \quad (123)$$

$$\text{Hydraulic radius, } r=\frac{a}{p}=\frac{\pi d^2}{4\pi d}=\frac{d}{4}. \quad (124)$$

Substituting $\frac{1}{r}$ for $\frac{p}{a}$ of (124) in (123),

$$v=\left\{\frac{2gh}{(1+c_e)+\frac{c_f l}{r}}\right\}^{\frac{1}{2}}. \quad (125)$$

Factoring (125),

$$v=(2gh)^{\frac{1}{2}}\left\{\frac{1}{(1+c_e)+\frac{c_f l}{r}}\right\}^{\frac{1}{2}}. \quad (126)$$

Under the heading, "flow of water through short tubes," the value of the mean coefficient of discharge has been shown to be $c=.815$. But $c=c_v=.815$; that is, the coefficient of flow at the inlet orifice of a short tube, is equal to the coefficient of velocity in the pipe, estimating the beginning at that point, where the stream, after contraction, expands so as to fill the pipe.

Substituting the value of $c_v=.815$ in equation (115),

$$c_e=.505. \quad (127)$$

Substituting the value of $c=.505$ in (125),

$$v=\left\{\frac{2gh}{1.505+\frac{c_f l}{r}}\right\}^{\frac{1}{2}}. \quad (128)$$

In determining the velocity of flow in a pipe, whose length exceeds a thousand times the diameter, the value of $(1+c)$ in (125), being small in comparison

ENGINEERING NOTES.

A DEVICE FOR ANNOUNCING SHALLOW WATER.—A curious invention especially designed for navigating the Nile, but which is applicable to other rivers, has been brought out by Messrs. Yarrow, of Vickburg. The object of the invention is to notify the pilot of the existence of sand banks or rocks lying directly in his pathway. The invention consists of two poles projecting about 50 feet ahead from the post and starboard sides, at the end of which are suspended two vertical iron rods. The bottom extremities of these come about one foot below the level of the boat itself. Attached to each of these vertical iron rods is a wire rope, which passes inboard, and is connected with the whistle on the boiler; and the gear is so arranged that immediately this indicator touches a rock or sandbank, it instantly causes the steam whistle to blow. This plan, in the first instance, draws the pilot's attention to the fact, and also points out to him on which side of the steamer the sandbank or rock exists, so that it gives him warning in which direction to steer.

A NEW ELECTRIC STREET RAILROAD.—An electric street railroad is nearly completed in South Bend, Ind., built on the Van Dusele system. The current is led to the cars by an overhead wire upon which a traveler runs, and, as there is only a single wire, special arrangements are provided to allow the travelers moving in opposite directions to pass one another. The energy is obtained from two large dynamos, both fields of which are excited by a single exciting dynamo. The machines are run by water power. The tracks constitute the return circuit, and to make a good circuit strips of brass are laid under the joints of the rails. The speed of car is under full control by means of switches, and the road will soon be in regular operation.

TRANSMITTING POWER BY ELECTRICITY.—Some experiments which have been made at Creil, France, on the transmission of power by electricity do not seem to have been eminently successful. The idea seems to be to utilize the power of distant waterfalls to generate the power, which is then conveyed to any desired point by electricity, and there used for any desired purpose. Theoretically this seems to be all right, but practically, for manufacturing purposes, it seems to be decidedly cheaper for a man to locate his shop close to the source of power, and use it directly, instead of at second hand. In these days of railroads and cheap transportation, it is found cheaper to transport manufactured goods than power, with its attendant loss of 50 per cent, to say nothing of its uncertainties.

THE COFFER DAM was well known to the ancients, and was generally used by them in some form to protect them in sinking the foundations of bridges, and other similar purposes, where loose earth or water interfered with the progress of the work. In this age of railroads and stone docks it is often necessary to build in situations where the coffer dam is impracticable, on account of the great depth required to find a secure foundation. Hence the invention and importance of the caisson. There are many modern engineering triumphs which would never had an existence had it not been for this modern invention.

THE STILETTO.—No event in the last twenty years has created so profound and widespread an interest among shipping merchants, steamboat men and yachtsmen, as the performance of the little steam yacht Stiletto, in beating the fast steamer Mary Powell. The hull of the Stiletto is the product of a series of experiments, made with models in the same manner as was followed by Froude, the English ship-builder. The engine is built so as to produce the greatest amount of power with the least possible amount of vibration. The boat has made the extraordinary speed of twenty-five miles an hour.

SUBSTITUTION OF HUMAN LABOR BY MACHINERY.—Mulhall, in his "Progress of the World," writes that in effect the invention of machinery has given mankind an accession of power beyond calculation. The United States, for example, he says, makes a million sewing machines a year—a large overestimate—which can do as much work as formerly required 12,000,000 women working by hand. A single shoe factory in Massachusetts turns out as many pairs of boots by aid of machinery as 30,000,000 boot-makers in Paris, who do not use machinery.

THIS YEAR will see the completion of one of the greatest submarine engineering feats ever undertaken in Britain. The Severn tunnel was first begun by the Great Western Railway sixteen years ago, and the accomplishment of the great work has been delayed by difficulties which a few years back would have been thought insurmountable. The enterprise has cost considerably more than five million dollars.

AN ELEVATED RAILWAY FOR PARIS.—Jules Garnier has designed an elevated railway for the city of Paris, which is to be completed in time for the Exposition of 1889. *Science* says this will be about 13 miles long, and will cost \$10,000,000. The structure will be composed of two tracks, one above the other, on an iron frame.

USEFUL INFORMATION.

CELLULOID.—The manufacturers of this extraordinary substance have succeeded within the past few years, not only in decidedly improving the quality and the mode of manipulating it, but also in considerably extending its uses. At the Novelties Exhibition lately held in Philadelphia, the exhibit of the Celluloid Manufacturing Co., of Newark, N. J., was universally acknowledged to be the most beautiful and attractive of the many fine displays, for which it was noted. The following enumeration of the numerous products of celluloid there to be seen, from the official catalogue will give an idea of the extent to which this material is employed at the present time in the arts. The inventors truly have given the world a new material, capable of an almost indefinite number of uses, as a substitute for other materials, and in most of the cases when this substance is used, it proves to be better adapted for its intended purpose than the original. At the recent Novelties Exhibition, celluloid was shown in rods, tubing, sheet and rolls, and in not less than seventy-seven different manufactured forms, among which were the following: Brushes, combs, mirrors, and toilet articles in imitation of ivory, coral and amber; collars and cuffs, jewelry, cork-screws, card cases, soap cases, powder boxes, paper knives, thimbles, restaurant checks, shoe hooks and horns, napkin rings, mouth pieces for pipes, parasol, umbrella and cane handles, etc., in imitation of coral, ivory, malachite, tortoise-shell, amber, lapis lazuli, agate and carnelian, etc.; piano keys and organ-stop knobs, in imitation of ivory; white and colored letters for signs, monograms, trademarks, etc.; stereotype plates and type and wood cuts, moldings and veneers for picture frames, show cases, cornices, panels, etc., in white and colors; mountings for spectacles, eyeglasses, opera glasses, etc., substituting and imitating hard rubber, horn, tortoise-shell, etc.; handles for table cutlery, plates for artificial teeth, trimmings, whip handles and pencil cases, statuettes, rollers for skates, spoons and forks, fancy leather for hand satchels, etc.

THE USE OF EMERY WHEELS.—Malleable iron, wrought iron and copper are the hardest things you can use an emery wheel upon, because they are the softest, and the points of emery take a deeper bite or hold on them. It becomes a question of which is the toughest—the cement of the wheel, or the metal it is acting upon. Soft metal will pull the emery grains out of the wheel bodily, and therefore a wheel used upon soft metal will wear out faster than upon hard metal. Steel and chilled iron do not wear a wheel nearly so quick as the softer metals, because, being harder than malleable iron, wrought iron, copper or good brass, the points of emery do not take so rank a cut.

If an emery wheel is out of round and jumps in use, a piece of bar copper, used instead of a diamond, and held on the rest firmly, so as to come in contact only with the high portions, will remove such portions and restore the wheel to a true surface faster than many would suppose. It is a good substitute for a diamond. The wear and loss of one ounce from the copper now and then is less costly than the diamond. If users of emery wheels would realize that an emery wheel has no intelligence, and would place it in charge of men who have, and give it one-half as much attention as other tools, much better results would follow, and less complaints would be made, which complaints, in 99 cases out of 100, reflect directly upon the user instead of the wheel itself.

THE PRESERVATION OF ROPES.—The preservation of scaffold ropes is a matter of great importance when scaffolding remains erected for any considerable time, especially in localities where the atmosphere is destructive of hemp fiber. It has been suggested that in these cases the ropes should be dipped, when dry, into a bath containing 20 grams of sulphate of copper per liter of water, and kept in soak in this solution for four days, afterward being dried. The ropes will thus have absorbed a certain quantity of sulphate of copper, which will preserve them from the attacks of animal parasites and from rot. The copper salt may be fixed in the fiber by a coating of tar or by soapy water. For tarring the rope it is better to pass it through a bath of boiled tar, hot, drawing it through a thimble to press back the excess of tar, and suspending it afterwards on a staging to dry and harden. In the second method, the rope is soaked in a solution of 100 grams of soap per liter of water. The copper soap thus formed in the fiber of the rope preserves it from rot even better than the tar, which acts mechanically to imprison the sulphate of copper, which is the real preservative. It is not stated whether the copper treatment is equally serviceable with dressed as with plain hemp ropes.

MECHANICAL GLASS BLOWING.—Messrs. Appert have devised a process, in their factory at Clichy, in which they use air stored under great pressure, so as to dispense altogether with the necessity of blowing by the mouth. Glass blowers are peculiarly susceptible to various disorders, such as diseases of the lips and cheeks, and predisposition to tumors and rupture. These affections are the more serious because boys are often employed when the eye is weakened by rapid growth. The high temperature and dry atmosphere increases the

unfavorable hygienic conditions. The new process entirely suppresses blowing by boys, and, with rare exceptions, by adults also. The manufacture of glassware is thus ameliorated by rapidity of execution, as well as by the perfection and the large size of the pieces which are produced.

ENGRAVING ON GLASS.—The hard point for inscribing and engraving rare stones is doubtless older than the lathe, and was certainly used in engraving glass during classical and medieval times. The Flemish, Dutch and Germans, within the last three centuries, used it with great success, as testified by examples of their work still remaining. Diamond or other hard stone point—or steel points similar to those used by some glass carvers of the present day—may be employed in engraving glass, and handled in the same way as ordinary gravers for metal or wood. The glass should be coated with a mixture of gum and milk, on which, when dry, a pattern may be drawn or transferred previous to engraving. Very fine line and hatching and stipple effects can be produced by this method. Some of the specimens in the Slade collection of the British Museum are exquisitely done, especially those attributed to Wolffe and Heemskerk. The great drawback to such engraving, when delicately finished, is that it cannot be well seen unless it is held close to the eye and in a good light.—*Art Journal*.

LASTING PROPERTIES OF CYPRESS.—Evidences are abundant and conclusive in regard to the lasting properties of this wood. Hence, it is gradually creeping into use more and more each year. Already it is being used in many houses in New York City in finishing, with calls for more. Five million shingles is the estimated amount of consumption in the New York market, with an increasing demand. At least 3,000,000 feet of the wood will be required to supply the market in railroad ties. It is exported to some extent to various ports. Railroad ties have been sent to Cuba, France and England. Lumber has been sent abroad, but in no great quantities.

PEWTER is made of tin four parts and lead one part.

GOOD MEALTH.

DROOPING SHOULDERS.—This is a serious evil. It comprises both appearance and vitality. A stooping figure is not only a familiar expression of weakness or old age, but it is, when caused by careless habits, a direct cause of contracted chest and defective breathing. Unless you rid yourself of this crook while at school, you will probably go bent to your grave. There is one good way to cure it. Shoulder-braces will not help. One needs, not an artificial substitute, but some means to develop the muscles whose duty it is to hold the head and shoulders erect. I know of but one bull's-eye shot. It is to carry a weight on the head. A sheepskin or other strong bag filled with twenty to eighty pounds of sand is a good weight. When engaged in your morning studies, either before or after breakfast, put this bag of sand on your head, hold your head erect, draw your chin close to your neck and walk slowly about the room, coming back, if you please, every minute or two to your book, or carrying the book as you walk. The muscles whose duty it is to hold the head and shoulders erect are hit, not with scattering shot, but with a rifle ball. The bones of the spine and the intervertebral substance will soon accommodate themselves to the new attitude. One year of daily practice with the bag, half an hour morning and evening, will give you a noble carriage, without interfering a moment with your studies. It would be very difficult to put into a paragraph more important instruction than this. Your respiration, voice and strength of spine, to say nothing of your appearance, will find a new departure in this cure of drooping shoulders.—*Dio Lewis*.

CATCHING COLD.—I have made a discovery which has proved invaluable to me, and I believe also to others to whom it has been imparted, and that has made catarrh to me very much less formidable than it used to be. The discovery is that all the most violent symptoms, the running at eyes and nose, sneezing, lassitude, weariness, and the thousand and one other distressing feelings that are included in the equipment of this well-known complaint, may be completely suppressed simply by abstaining from all liquid food and drink of every kind for a period varying, in my own case, from 24 to 50 hours, according to the violence of the symptoms. Take all the food dry, drink nothing, not even a cup of tea nor a spoonful of soup.—*Hall's Journal of Health*.

A NEW METHOD OF INTRODUCING MEDICINE INTO THE SYSTEM.—At a meeting of the French Academy of Medicine, held September 22d, M. Brondel read a paper on the introduction of certain medicines into the system by means of electricity. If the electric current is made to pass through a solution of a salt, the salt is decomposed, the metallic base passing to the negative pole, and the acid, or metalloid, to the positive pole. The iodides are easily decomposed by electricity. In order to introduce iodine into the system, a rubber plate, moistened with a solution of iodide of potas-

sium, is placed upon the surface of the body. Over this plate the negative pole of a battery is applied, while the positive pole is placed upon a part of the body toward which it is desired that the iodine travel. The iodine separates from the potassium, which remains at the negative pole, and passes with great rapidity through the tissues toward the positive pole. This may be demonstrated by testing with a starched paper, which becomes blue. A great number of substances can thus be made to traverse the tissues, and the applications of this discovery are numerous and important. M. Brondel has in this way cured uterine fibroids, a case of perimetritis, rheumatic ovarian neuralgia, and several cases of chronic rheumatism.—*Medical Progress*.

REMEDY FOR EARACHE.—We can recommend, from our personal experience, says the *Therapeutic Gazette*, an effectual means of administering chloroform in this complaint, and one which is absolutely devoid of danger. This is to loosely fill the bowl of a common clay pipe with cotton batting, upon which pour as much chloroform as it will retain without dripping. This done, insert the end of the stem carefully into the ear, and placing the opening of the bowl in the mouth blow gently the vapor of chloroform against the tympanum. We have found this to be an exceedingly effectual relief for earache of children, uncomplicated, of course, with inflammatory disturbances.—*Medical Times*.

DOCTORS MUST KEEP UP WITH THE TIMES.—A doctor was lately brought before the German tribunals for having neglected to keep himself informed as to the modern methods of practice. A servant who received a wound in the chest in April last died from septicemia under the care of this doctor, who, despising antiseptic dressings, treated his patient according to ancient usages. The court held that "every practitioner should keep himself informed in the accomplished progress of science, and have an exact knowledge of modern systems of treatment. If these had been employed the patient's life might have been saved, hence the liability for negligence."

BORAX AS AN INTERNAL DISINFECTANT.—In the *Union Medicale*, Dr. Cyon confirms the statement, made by Dumas in 1878, that borax is possessed of most valuable antiseptic powers. Independently of its value for the preservation of food, it is a great preventive of infectious diseases, and may be employed internally to ward off epidemics. It may be taken for months or years with impunity, and constitutes a valuable prophylactic. Dr. Cyon states that it is a remarkable fact that in all epidemics of cholera the workmen in boracic acid factories have always escaped the disease. The usual dose is five or six grams (75 to 90 grains) daily, taken for an indefinite time.

IRRITATION FROM RED FLANNEL.—The irritation from red flannel underclothing is not caused by the dye, as many suppose, but by the coarseness of the wool fiber of the goods. A belief is also very common that red flannel has some special value because of its color, but the belief is without foundation, and any other color where the flannel is of the same quality is equally efficacious. The red flannel selected is often, and perhaps generally, thick and heavy in texture, and consequently causes an irritation of the skin, for which the dye-stuff is by no means responsible. A softer flannel, or one made softer by wearing and washing, is what you need.

MEDICAL PLANTS IN BRAZIL.—Consul Wright of Santos, Brazil, encloses in a letter to the State Department notes upon the medicinal plants of that country. The compilation is the work of S. S. Schindler, a native-born citizen of the United States, who is now in Brazil. From Mr. Schindler's notes it appears that the country abounds in herbal remedies, and that aloe, the new cancer cure, is but one of hundreds of trees possessing properties of great value, as yet almost unknown to materia medica.

ERYSIPELAS has appeared in Nicolaus, Cottonwood, Vallejo, Truckee, Forest Hill, Santa Ana, Calico and Etna. As this disease may be classed among those of a contagious and inoculable character, every sanitary precaution ought to be taken to prevent its spread, as the poison of this disease is known to be one of the most resistant to the action of disinfectants, and capable of remaining active for a long period of time, even for years.

THREE LITTLE WICKS.—There are three little wicks to the lamp of man's life, brain, blood and breath. Press the brain a little, its light goes out, followed by both the others. Stop the heart a minute and out go all three of the wicks. Choke the air out of the lungs and presently the fluid ceases to supply the other centers of flame, and all is soon stagnation, cold and darkness.

SUDDEN SICKNESS.—In case of very sudden sickness, which often proves to be incipient pneumonia, a safe remedy is to apply a plaster of soap and Indian meal from the throat down below the bowels as soon as possible. If that does not give immediate and permanent relief, send for a physician, for unless relief is quickly obtained, there is danger of a speedy, fatal result.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

GREEN ADEN.—Amador Ledger, Jan. 2d: This quartz claim, which is situated about a quarter of a mile south of the Pacific, has been sold to Ballard & Co., a wealthy company that last year conducted the extensive but unprofitable mining operations at Enterprise. We understand the terms of the purchase are that Aden, the owner, receives \$3000 in cash, and one-eighth of the stock unassessable; the company agree to spend \$150,000 within a stated time in developing the mine, otherwise the mine and whatever improvements may have been placed thereon, may revert to Aden. Active mining operations are to commence at an early date, under the direction H. Rees, of Sutter Creek, who has been engaged as superintendent. A cleanup comprising about 30 tons was made recently at the five-stamp mill of the St. Louis mine, near Pine Grove, which yielded \$14 to \$15 per ton.

SUTTER CREEK.—Ledger, Jan. 2: The repairing of the Eureka shaft is rapidly nearing completion. There is but 200 feet more to be done, when drifting in the direction of the old works will be prosecuted. A thorough cleanup was made at the Mahoney this week. The rock panned out slightly better than anticipated. The bullion has been sent below, and orders are expected daily for the extraction of the surface rock to be resumed. At the Lincoln, work is being actively prosecuted. Ten more stamps are being put in running order. The rock is being taken from the surface, and there is a large body of it, sufficient to run the mill to its present capacity for some time. The Amador sulphurets works closed a few days ago for lack of sulphurets. They will probably be idle for a couple of months.

RICH ROCK.—Amador Dispatch, Jan. 2d: Very rich rock still continues to be unearthed in the Moore and Amador Queen mines. In fact, the reports are encouraging from all the mines in that vicinity, especially at the St. Julien. The Zeile mill, hoisting works and reduction works will be lighted up with gas as soon as the necessary pipes and fixtures can be put in.

ROLLER MILL.—Amador Sentinel, Dec. 30: Lamb, Markstrom & Co. are putting up a roller mill at their mine near Enterprise, to cost \$750, and it is expected to be in working order in ten days. They have very good rock. Rock of extraordinary richness is reported discovered at the Shugert mine. A \$30,000 pocket is reported and pieces of gold as large as a hen's egg are in the rock, which is of a dark blue character.

Butte.

BIG BEND.—Butte Record, Jan. 2: The tunnel at Big Bend is encountering considerable water, as it approaches the slope of the mountain near the river. The quartz vein recently encountered by the tunnel, came near making a blockade by a cave. The lode is about five feet in width. Specimens of the ore have been sent to Buffalo to be assayed and tested. It is supposed to be the vein, pockets from which were worked by Peter Allis, who lost his life in the Marchella Ross Vendetta, and whose body was eaten by the wild hogs of the vicinity. If that supposition is correct it may prove a rich vein. It is expected the tunnel will be completed sometime the coming spring. The grade of the tunnel will strike the North Fork some three feet above the bed of that stream. Of course there will be an immense crowd present to see the water turned into the tunnel.

OLD MINES PAYING.—Cor. Butte Record, Jan. 2: The mining interest upon the creek is opening up finely, new discoveries being made, and old mines paying better. The last cleanup of Moss & Co's. claim paid well. For the labor performed it paid the best. May success attend their efforts. They have been a cash company, have expended many thousands of dollars which have been gathered up in the immediate vicinity of their works, and has been a benefit to our county. They are very careful of their debris, impounding all by heavy brush dams. Hedges & Weatherbee have a good claim, and are working the same, although at the present time at a disadvantage, owing to too much water. It is a ravine claim, and as soon as the water runs down all will be prosperous.

Calaveras.

NEW MILL.—Calaveras Chronicle, Jan. 2: We learn that the new stamp mill being erected at the Fine Gold mine by Haggin & Kervin is well on towards completion, and that in about three weeks' time it will be thundering away on the best kind of quartz. The mine has improved both in richness of ore and width of ledge as depth has been attained. We hear that the Cook Brothers' mine sale is in a muddle. The purchasers demand an extension of time from the Cooks, which they refuse to give. The outcome of this Cook imbroglio will undoubtedly be all right. The contract expired yesterday, and as the money was not paid to the Cooks the mine reverts to them. The mine is good, and a new deal will be made with some of the old bondholders, who, we understand, are ready and willing to "stay with the mine."

MURPHYS.—Citizen, Jan. 2: The Oro Plata mill starts up under the most favorable auspices, and there can be no doubt that it will not carry out the fullest expectation of those sanguine of its successful working. We predict a long and successful run with large bullion shipments. The other mines in the vicinity are progressing favorably, with good reports from various quarters. A number of mining men have been among us of late, and they were favorably impressed with the mines they examined.

Colusa.

BIG STRIKES.—Denver Republican, Jan. 1: The talk in the hotel lobbies and among mining men generally, is concerning the rich strike in the Henrietta and Maid-of-Erin mines in Leadville. Information received in Denver yesterday stated that the ore body had now been penetrated to a depth of thirty-six feet, and still there is no bottom. The character of the ore body has changed from sand carbonates to a hard substance, however, and the belief is that as soon as this formation is passed through, the depth of the ore body will be disclosed. The ore grows richer as depth is attained. For the

first 20 feet the ore was sand carbonates, carrying 45 per cent lead and 10 ounces silver. For the next 10 feet the character of the ore was the same, only it was richer, carrying 55 per cent lead and 15 ounces in silver. For the last few feet it required blasting to remove the ore, and it is still richer in silver and about the same per cent in lead.

Fresno.

A NEW CAMP.—Fresno Expositor, Jan. 1: West of the Grub Gulch mines in Fresno county a new mining district was organized at a meeting held on the 15th of December at Knoblock's ranch. James B. Baker acted as Chairman and John T. Young Secretary of the meeting. The district is called Fresno mining district, and is bounded as follows: Commencing at a point on Fine Gold, opposite the residence of Frank Walker; thence running westerly to a point on Coarse Gold creek, to a point near or opposite the residence of Peter Johnson; thence down Coarse Gold creek to its intersection with Fresno river; thence down Fresno river to Still's ranch; thence in a southeasterly direction to the bridge on the San Joaquin river; thence up the San Joaquin river to the mouth of Fine Gold; thence up Fine Gold creek to the point of beginning. John T. Young was elected Recorder of the district, and a code of laws was adopted.

Inyo.

PLEASED MINERS.—Inyo Independent, Jan. 2: The proprietors of the White Hill mine are well pleased with the returns from their last shipment of ore. The amount shipped was 42,275 pounds net. It contained 81.67 ounces silver per ton, and 70.25 per cent lead. For the silver they received \$1.02½ per ounce, and for the lead \$4.60 per hundred pounds. Gross value of the ore per ton, \$124.94; less charges \$20; net value of ore per ton, \$104.94. Total value of ore, \$2005.16. The owners of the mine, Alexander, Kehoe and Barnes, are working miners. All the help they employ in their mine is one man occasionally, nearly every dollar of the above sum has been divided among the three men, and the whole of it was earned in a few weeks. The mine is now looking as well as ever it did, and another shipment as valuable as the last will be made before long. The Inyo mountains offer a most promising field to industrious and intelligent miners.

NOT SATISFACTORY.—Inyo Register, Jan. 1: Robt. Love had some ten tons of ore from the old Piute mine worked at the Maxim mill by way of a test, as it was known to be too base to give much hope of a margin for profit by the plate process alone, although it assayed so high it was deemed best to try it, for there are hundreds of tons on the dump and in sight. It barely paid milling expenses, so some other process will be tried, for it is a big mine, and the ore seems to be quite rich.

Mariposa.

DILTZ.—Mariposa Gazette, Jan. 2: Operations on the north side of this mine have been commenced and with an increase of water from the last rain the large embankment is being washed through a ground sluice, which uncovers a vast amount of float quartz rock that will pay to mill. Work has also been continued in the large open cut on the south side, which shows a vein and vein matter over 40 feet wide. Several slides in the hill have occurred, some of which have covered up two or three shafts on the main vein.

FRANCIS MINE.—Mariposa Gazette, Jan. 2: This mine, which was started up several months ago under the auspices of Messrs. Chodzki & Bourdage, late of the Quartz Mountain mine of Fresno county, is likely to prove a success and become one of the permanent mining properties of a profitable kind of the county. A sufficient test has been made by the proprietors to satisfy them that there is plenty of paying ore to justify permanent improvements upon the mine. Since the completion and starting up of their ro-stamp mill by steam power, they have ascertained that a water power could have by opening up and deepening an old ditch some three or four miles long to Mariposa creek, formerly constructed and used by the original founders of the mining property. It has been ascertained that sufficient water can be had to turn an overshot wheel at least six months in a year, which will make a saving of \$20 a day and upwards from the present mode of using steam power. The works at the mine and mill have been suspended for a time with a view to this important change. The new ditch is about completed, and the material for a waterwheel and fixtures is on its way from San Francisco.

Nevada.

A GLANCE AT THE MINES.—Foothill Tidings, Dec. 31: Mining is going steadily and surely ahead in this district, and out of the numerous prospects now in operation here, we are almost sure to get two or three dividend paying mines, which will afford employment to a great number of miners.

THE CROWN POINT MINE.—Owned solely by A. Gauthier, is being steadily worked and there is no particular change in the quality or quantity of the ore. Several rumors are current that the mine has been sold for \$300,000, but there is no truth in the report. The Triumph concentrators have been placed in the mill at the Crown Point and are doing effective work in saving the very rich sulphurets which comes from the ore in abundance. The ledge is over three feet in width and averages about 13 per ton, with now and then a washub full of specimen ore. It is the intention of the owner of the mine to enlarge the mill during the coming summer.

THE BOSTON.—Now working on the old Granite Hill ledge, situated on the eastern bank of Wolf creek, and at one time owned by Martin Ford & Co., is doing well, and has most flattering prospects for its future. A company of twelve men have leased this property for a period of two years and a half, and have opened the mine to a depth of 230 feet on an incline, and have erected pumping machinery, run by water power, on the property. The north and south drift in the Boston are each in 60 feet. The size of the ledge in these drifts varies from 6 to 8 inches. The first crushing taken out by the present lessees paid \$25 per load, and shortly after a crushing of 35 loads paid \$72 per load, while the last crushing, 27 loads, which was completed but a few days since, gave a yield of \$70 per load. The present lessees of the mine will purchase the property, and will pay for it with the money taken from the mine; and the owners will all be residents of Grass Valley.

THE PHOENIX MINE.—Located on Osborne hill, promises to come to the front as a dividend payer, and that too in the near future. The shaft is now

down 85 feet below level No. 1, and shows a 12-inch ledge, with free gold and plenty of sulphurets. The miners have now commenced cutting a station at the bottom of the shaft, and at the end of the week drifting will be commenced on the chute. A crushing of 30 loads of ore has just been cleaned up and the sum taken from it was \$1000, the sulphurets not yet having been worked. This rock was crushed by the tributers, who took it out on half shares and it paid them, on those terms, \$3 per day. The ledge is from one to four feet in thickness and is in good ground. The Phoenix has decided to stop the tributers' crushing came from, until the mill for the company is built, which will be early in the spring. The southwest drift in the Phoenix is now in 40 feet, and has a six inch ledge of good ore.

The Coe mine, lately the property of Hon. E. W. Roberts, was sold to-day by a party of Grass Valley, ans, who will commence work upon it as soon as possible. The shaft on this mine is down 500 feet; the rock has been sufficiently tested to disclose its qualities, and gives promise of paying good profits. Messrs. George Murphy, A. D. West and other enterprising citizens are the purchasers of the Coe, having paid \$5000 for it. The Horseshoe company have just let a contract for sinking their shaft 100 feet deeper. The shaft is now down 140 feet, and the ledge is a good one in appearance. The contractors who have lately been working on the Horseshoe have about six tons of ore on the dump, which will soon be put through one of the custom mills. The Empire mine, the oldest in the district, is now taking out pay ore from the eight, 10, 11 and 15 levels. The shaft is being sunk for the 1600-foot level, and in addition to the 20 stamps already employed in the mill, 20 stamps more are being added. The Idaho is the same old story. On Monday next it will pay its 15th dividend. They are now sinking for the 1700 level. The lower levels in the mine are good.

The Lone Tree is being steadily worked, and, although a mere prospect, the owners have the utmost confidence in its future as a paying mine. The Magneta mine has just completed its new hoisting works. The shaft is down 400 feet, and will be sunk by contract 200 feet deeper. The North Star paid at its last crushing, \$60 per load in free gold, without counting the sulphurets, which pay \$60 per ton. The company is sinking on the ledge.

CROWN POINT MINE SOLD.—Nevada Transcript, Jan. 5: It was reported here yesterday that the Crown Point quartz mine at Grass Valley had been sold to an English company by Mons. Gauthier for \$300,000. The first installment of the purchase money was paid yesterday, Mr. Gauthier and the agent of the buyers coming to the county seat to close the negotiations.

BADGER HILL MINE.—Grass Valley Union, Jan. 2: The Badger Hill Mining Company has definitely determined to start up work on the mine as early in the spring months as practicable, which will be about the month of April. New hoisting works will be erected, and the machinery will be strong and capable of working the mine to a considerable depth. Estimates are being made as to the cost of introducing water power, which is preferred to steam if the power is obtainable on favorable terms. No doubt is felt that the Badger will open up a good mine, and the company will have a working fund that will insure a thorough exploitation of the ground.

Placer.

MAYFLOWER.—Placer Argus, Dec. 31: F. Chappell, superintendent of the Mayflower and Live Oak mines at Forest Hill, was in Auburn Tuesday on his way to San Francisco to attend a meeting of the directors of the Live Oak Company. He reports things as prosperous at the mines. The Live Oak is prospecting very favorably, and the owners and all concerned are elated.

IOWA HILL DIVIDE.—Cor. Placer Republican, Jan. 1: Good news is being received from our drift mines, notable among which is the Watts, where they have cleaned up some ten ounces more in the last week's run than they have done in the same length of time before, and still some more in sight. McIntyre is opening up his claim, and is very much encouraged with the indications. It is true the Succor Flat men are off. There are those among us who think they can make the old claim pay yet, but not with fancy salaries, etc. Report has it that the Golden River Company have determined to enter into mining on an extensive scale, they having bonded a large lot of mining ground above Damascus, as well as the Mountain Gate mine. Experts have been engaged for several weeks in the latter named mine to locate, if possible, where the pay gravel came from and whither it went. I refer to that part of the rich gravel that the Mountain Gate Company did not get, as where they are taking out pay at present does not look like an outlet. Parties connected with the Morning Star inform me that within the last two months their ground is looking better than it has for several years, more of a permanent character; the company is preparing to open up in good shape ere long. Hoorman & Co., who have been driving a bed-rock tunnel for eighteen months, have not succeeded to date in finding the expected rich lead, though Captain H. was very sanguine he knew exactly where to go for it. The China, below the last named mine, are finding very rich cemented gravel. They are forced to use powder. The Vigilance Company on Grizzly Flat, are extending their tunnel into the main hill and have struck pay gravel. Hazlethorn, on the opposite side of the canyon, who has been looking for pay, has at last come on to a body of gravel that paid over wages for the last two weeks. Gas has been very patient, and we hope he may get it good. The Lebanon Co., at Prospect Hill, is making another effort to find the lead. Rich gravel was found some years ago, but it gave out. They have commenced in what they call the upper channel, which is a singular formation, there being depressions in the country rock that seem to run in every direction, without any regard to the trend or grain of the same.

IOWA HILL DIVIDE.—Cor. Placer Republican, Jan. 1: There is not one hydraulic mine running on this divide at present, and it is evident that this character of mining is a thing of the past in this part of the country. The mines of Iowa hill, Forest hill, Michigan Bluff, Yankee Jim's and Todd's valley are entirely worked out as hydraulic propositions. Ditch property, in consequence, is rapidly depreciating in value, and will soon become almost worthless, except as a means of furnishing power. But while hydraulic mining is being discontinued, drift mining is being

energetically prosecuted. Work goes steadily on in the old drift mines, and many new tunnels are being driven in mines heretofore worked by the hydraulic process. The Morning Star, Golden Gate and Homeward Bound mines have quit as hydraulic properties, and drifting for the rich channels is being vigorously pushed by all three of them. Very fine developments have recently been made. The Morning Star mine, about 3000 feet in from the mouth of the tunnel. A large area of rich gravel has been blocked out, and it is the intention of this company to prosecute the work with energy. Bowie, the owner of the Homeward Bound, was here last week, looking after the affairs of his mine. His men are also driving a tunnel, and expect soon to strike pay gravel. The Golden Gate, under the management of Mr. Bowley, has turned out some rich gravel and many fine specimens during the year, one nugget worth \$230. Drifting is being continued, and considerable gravel is now on the dump. J. B. Hobson has a gang of men at work on his Blue Wing mine cleaning up bedrock, which was stripped a year or two since. He is also running a bedrock tunnel, intending to work the mine by the drifting process hereafter. The Chinese owners of the Union mine adjoining are not washing; the large body of pipe clay overlying their gravel, makes it unprofitable to hydraulic. They intend to soon commence drifting. The Watt brothers' drift mine, near Monoma Town is being steadily worked, and continues to pay handsome dividends to its fortunate owners. Drifting continues at the Harmon mine, at Wisconsin hill, and I learn that James Gleeson is contemplating the opening of a fine tunnel in the Columbia claim in the same locality. The deep gravel at Wisconsin hill is known to be very rich, and big results are expected. Gold-bearing gravel has been struck on the edge of a channel in the McIntire mine, above Giant Gap, and the owner, Mr. McIntire, is pushing the work with his characteristic energy. The Mountain Gate mine, at Damascus, has about 25 men at work, who are taking out gravel that yields \$3 a carload. This is considered one of the most valuable properties on the Divide. The Golden Fleece people have already struck gravel and an immense channel of over 1000 feet wide has been discovered. The present tunnel is found to be too high. Another lower tunnel will be started in the spring, to make it practicable to work the lower strata of pay gravel, and to drain the mine. At the Hog's Back mine, next east of the Golden Fleece, they have broken through the rim and found pay gravel, pitching off towards the channel. An immense flow of water drove the men from the tunnel, and another tunnel will have to be driven. The Bob Lewis mine, adjoining the Mountain Gate, is raking out gravel which pays from \$10 to \$12 a carload.

THE HOTALING IRON FURNACE.—A Hotaling correspondent of the Auburn Argus says: The furnace of the California Iron and Steel Co. will be in operation again soon, probably within the week. A number of hands are presently employed upon the great furnace, fitting up water-pipes, etc. Some 5000 tons of good-looking ore are on hand ready for smelting. Mr. T. B. Berry, the superintendent, anticipates a long and favorable run when the works are started up. Mr. William Gerhauser, who returned Saturday from a five-weeks' trip to Baltimore, brought with him from Maryland an experienced coal-burner and also a night foundryman. James Richards, foreman of the mine, has 23 men at work in shaft No. 2, where two Burleigh drills are kept running constantly. The shaft is 136 feet deep to the present workings. The ore in the north and south crosscuts is abundant and of good quality. During the late heavy rains the water broke into the north drift, and it has been found necessary to put in pumps to get rid of it. When the water shall be got out, an upraise will be started to open stopes for the greater facility of taking out ore. About 2000 tons have been obtained from No. 2 shaft during a few months.

Shasta.

MILL AND MINE.—Shasta Co. Democrat, Dec. 30: Andy Life has leased the mill at Lower Springs, and has commenced crushing his ore. Two new gold quartz strikes are reported to have been made on Squaw creek this week. Thomas McDonald, of Deadwood, went below yesterday morning, with a gold brick weighing nearly fifty pounds. A full force of men are at work in the Hardscrabble mine, at Igo, and a large quantity of dirt is moved daily. Geo. McDaniels is making fair wages on Irish gulch at ground sluicing and washing with a rocker. In early days this gulch was enormously rich. Another rich strike was made a few days ago on Squaw creek by two prospectors whose names we fail to recollect. The new find is to the northeast of Warner & Lowden's claim. A company of Red Bluffers are developing a fine prospect west of Redding, near Irish gulch. They have struck ore at a depth of 40 feet. It is thought to be a continuation of the tellurium lead. Forbes & Co. are running a tunnel on their claim west of Dan O'Neals, that will tap a rich ore chute about 110 feet deep. The boys have made their prospect pay its way so far, and they have fine prospects ahead. Whitton, Bassett & Stocks, proprietors of the Lilian Maude and Carrie Huston mines on Squaw creek, sent an order yesterday to Sacramento for a quartz mill, which they will endeavor to put up on the ground within 90 days. They have commenced erecting a mill house. Col. Stocks says the mill is a new invention, and claims that it is pronounced by experienced mining men to be the best ore crusher made. Jake Hudson and a partner are developing a mine near Alabama gulch—about two miles up the river from Reid's Ferry, opposite Middle creek—which promises to be a bonanza. They are now down about 25 feet, and are taking out ore, not only rich in free gold, but also in sulphurets. Near the surface the rock assays from \$11 up into the hundreds, and the ore has steadily improved as depth is attained. At present developments they feel that they have a rich mine, and it would not be surprising that if, sooner or later, they should strike a rich tellurium deposit. Simonds and Barnes have made four locations on Squaw creek, that as grass-root prospects promise to be as big mining property as there is in the county—the Lost Confidence or Balakalla not excepted. The new discovery is on the east side of Squaw creek, but on the same belt that those mines are located on. The surface ore is a genuine counterpart of the Lost Confidence and Balakalla, and assays from \$10 to \$165 in gold, and from \$3 to \$10 in silver. There seems to be an immense body of ore, and miners who have seen it say the extent of the ore body in sight is much greater than that of either the two mines above

mentioned. Another thing greatly in its favor is location and accessibility.

FRENCH GULCH.—Cor. Redding *Free Press*, Jan. 2: As for the mines most of them have made good cleanups. The Scorpion, owned by Gannon & Co., have just made a run of 250 tons or more, with a result of about \$6000. The Niagara mill is running on full time. The Washington mill has been running most of the time; also the Brunswick mill. McDonald & Franck, on Deadwood cleaned up on the 24th a good chunk of fifteen thousand. Watt & Co. have a good mine. Gibson Bros. are running their mill on good rock, and the other mines are doing well.

San Diego.

JULIAN.—San Diego *Union*, Jan. 1: Very flattering reports are being received respecting mining matters at Julian. The owners of the Owens mine are now in San Francisco buying machinery. They propose putting up a mill with a capacity of twenty stamps. The shaft of this mine is down 150 feet. They have drifted in fifty feet in one direction and have got a 100-foot ledge from three to five feet in thickness which shows free gold all through it. Robert Gardner is taking out rich ore from the Blue Hill mine. A large body of fine ore has been struck in the old Golden Rule ledge just below the Blue Hill, owned by Hanson & Sandeman. Preparations are making to reopen the old Golden Chariot mine, said to be one of the richest lodes ever discovered. In fact the mines all along the belt from Julian to Banner are being worked now, and there seems to be a revival of the mining excitement of former days. Work on the Shenandoah was resumed about two weeks ago and it is yielding well. A quantity of bullion from this mine was received at the Consolidated National Bank yesterday.

Sierra.

THE PHOENIX MINE.—Sierra *Tribune*, Jan. 1: Mr. A. C. Busch returned from San Francisco last week, where he had been for the purpose of making definite arrangements with a party of capitalists for the future working of the Phoenix mine. We are pleased to state that he succeeded in getting everything in satisfactory shape, and that there is nothing now in the way to prevent the parties from carrying out the extensive operations on this property, which they have in view. The San Francisco people displayed their good judgment by unanimously electing Mr. Busch Superintendent and General Manager of the mine.

BALD MT. EXTENSION.—Mt. *Messenger*, Jan. 2: At the annual meeting of the Bald Mt. Extension Co., Saturday Dec. 26th, held in Downville, the old Board of Directors—H. T. Briggs, S. B. Davidson, J. W. Orear, Robt. Forbes and H. H. Purdy—were re-elected for the ensuing year. After the adjournment of the stockholders' meeting the Board met, re-elected H. T. Briggs President, and declared a New Year dividend of ten cents a share, aggregating \$6000, payable Jan 1st at Scamman's bank, Downville. The lead at the Extension mine, Forest City, is 260 feet wide, and the gravel from the latest upraise, near the face of the main tunnel, averaged over \$5 a load.

NEVADA.

Washoe District.

GOULD AND CURRY.—Enterprise, Jan. 1: On the 1000 level, west crosscut No. 2 is now in 215 feet. Face in dry vein porphyry, quartz and clay. In the 600 level, the joint station with the Best and Belcher is being repaired, and the west drift therefrom cleaned out and retimbered, a distance of over 100 feet. This reopening is intended for ore explorations at that level. The pumps at the Osbiston shaft are to be started into operation directly. There is about 500 feet of water in the shaft, the surface of it being at the 2000 station, not the 500, as our evening contemporary has it, therefore it will not take long to pump it out, when the shaft is to be sunk to a level corresponding with the 3200 level of the Combination shaft, with which connection will then be made by means of lateral drifts from both ways.

HALE AND NORCROSS.—Exploration work is suspended in the upraise in the good ore body, above the deep winze station, on the 3000 level. This is, by reason of not being able to remove the ore and waste extracted on account of the hoisting facilities of the Combination shaft being fully occupied and employed in sinking the shaft deeper. On the 3000 level, the main lateral drift north is being steadily advanced in very promising vein matter. It has reached the end of the diamond drill hole, and is within 70 feet of the Savage line. No water is encountered as yet; in fact, the diamond drill has been again inserted and is being run ahead from the face of this drift, in order to guard against any possible damages from some unexpected flood.

CON, CALIFORNIA AND VIRGINIA.—On the 1750 level, the ore breasts and stopes are holding out well, yielding about 125 tons per day, of the average assay value of \$16.50 per ton. The northwest drift on the 1600 level, making good progress toward the old bonanza workings. Ore has been tumbled out pretty lively from the Jones lease section, above the 1500 level, during the week, over 200 tons per day, as the lease becomes entirely defunct at the close of this year. This ore gives an average assay of about \$22 per ton.

OPHR.—West crosscut No. 3 from the main south drift, on the 400 level, is being steadily advanced toward the west wall, with no new features to mention. The repairs to the station at the main shaft on the 700 level, being made jointly with the Mexican and Union Consolidated companies are progressing well, and the drift to the northwest is getting started toward the ground of these two last mentioned companies for ore exploration purposes.

CROWN POINT.—From this mine and the Belcher 400 tons daily continue to be shipped to the mill. Owing to the winze connection recently completed between the 1600 and 1700 levels giving better air and facilities for extraction, more ore is being taken from the breasts in the vein at the latter point. This is of better quality than that from the old upper workings like that which comes from the Belcher.

CHOLLAR.—Nothing whatever is being done on the 3100 level, the drain boxes being fully laid throughout the main south lateral drift and properly covered in so as to carry off both the hot water and the steam. Work is concentrated in the sinking of the Combination shaft deeper, or to the 3200 level,

YELLOW JACKET.—Ore extraction from the old upper workings goes steadily ahead, supplying the Brunswick mill. There is plenty of low-grade ore in sight, but the best is being selected, as much of it is too low grade for any present use. Nothing new in the explorations on the 1700 level.

COMET.—From this old mine, on the west side of American ravine, Sirlott and West, of Silver City, are extracting some pretty good ore, the vein being two or three feet in width. It is being reduced at the Thompson mill, Lower Gold Hill.

SIERRA NEVADA.—The main north lateral drift on the 520 level makes steady progress in very favorably working vein matter, consisting of soft vein porphyry, with a little less quartz and clay than heretofore encountered.

KENTUCK.—Owing to milling repairs, etc., the ore yield has fallen off somewhat lately, but the stopes and breasts of the old upper workings are looking and holding out well.

ALTA.—The lateral drift north toward the Benton ground on the 700 level goes ahead as usual in promising vein matter, with streaks and bunches of low-grade ore.

UNION CONSOLIDATED.—The crosscut east on the 500 level, 100 feet south of the Sierra Nevada line is making steady advancement in vein porphyry, quartz and clay.

MEXICAN.—The lateral drift north from the east crosscut is being steadily advanced at the rate of about 40 feet per week in very favorable vein material.

BEST AND BELCHER.—West crosscut No. 3 still continues in favorable vein material and makes good advancement.

MONTE CRISTO.—Ore enough is being extracted to keep the mill steadily running.

Columbus District.

HOLMES.—Candelaria *True Fissure*, Jan. 2: In the cross developments we have 4 feet of good ore. This is the extreme eastern ore body in the mine. It is good ore, and looks like it will be continuous. We have at a point about 60 feet west of Cross development a good prospect, but it is not sufficiently developed to enable us to judge of its value. At point 18 we are still driving the drift.

MOUNT DIABLO.—The east drift from the north crosscut on the 4th level is in 50 feet and shows 2 feet of \$40 ore. The intermediate drifts from the winze below the east drift on the 4th level both show a little ore of fair grade. The east drift from the No. 7 winze is in 170 feet and shows a small streak of good ore.

POTOSI.—The lessees shipped two carloads of ore to San Francisco during the week. They expect to make another shipment of two cars in a few days. The mine looks about the same as at last report.

CLIMAX.—The tunnel has been driven 20 feet since last report. The face is in extremely hard ground, but it is hoped that it will change for the better soon.

GENERAL GRANT.—The ore is improving as we go down on the ledge. We have just got through an iron horse and the ledge is making into chloride very fast.

Eureka District.

ORE SHIPMENTS.—Sentinel, Dec. 31: During the ten days ending yesterday ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond works—Hamburg mine, 55 tons; Mimbre, 20; Silver Lick, 44; Rosalind, 1; Phoenix, 28; Jersey, 15; Lemon, 2½; Frazier & Molino, 19; Bay State, 8; Friday, 3; Grant, 11; Jackson, 28; Republic 3, and Lone Pine, 6. To the Eureka Con. works—Lord Byron mine, 2½ tons; Mayflower, 1½; Dunderberg, 35½; Marguerita, 7½; Enterprise, 2½; Hope, 1; and Irish Ambassador 8.

Esmeralda District.

AURORA.—Cor. Bodie *Free Press*: On Tuesday last, representing the Con. Esmeralda (limited) Company, arrived in Aurora, assistant superintendent Geo. Mills, civil engineer P. Mackay and foreman Harry Newton. Accompanying those gentlemen was Mr. Anderson, formerly of Bodie, who, it is understood, will at once begin surveying all the unpatented properties transferred by the late sale. It is learned that the operations of the company will, during the winter, be confined to the development of the Humboldt Con., on which undoubtedly a force of men will soon be put to work to pave the way for its first introduction to hoisting machinery, and to the development of the Aurora Con. by extending the tunnel—called the middle hill tunnel—sufficiently to cut all the veins belonging especially to that group.

AURORA.—Bodie *Miner*, Dec. 31: The sale of property at Aurora to the English company of capitalists embraces forty-two mines located on the different hills around that camp. It is not believed that the new company will commence anything like vigorous work at present. A few prospectors will probably be put on; but it will take until spring to properly perfect the plans for a thorough system of mining. Hence, although we are firmly convinced that Aurora is to become a prosperous little mining camp, it is no place to rush to just at present, with a view to business. We have it, also, but not on positive authority, that the sale embraces our railroad and the sawmills and timber tract at Mono lake, and that a branch railroad will be run into Aurora in the spring. One thing is certain, while we do not believe that the new company at Aurora propose to throw their money away, we do believe that they are shrewd and sagacious enough to make their money make money.

Tucacora District.

NORTH BELLE ISLE.—Times-Review, Jan. 2: Fair progress has been made with the work on the 150-foot level.

GRAND PRIZE.—Intermediate above 300 extended 18 feet, 200 level 12 feet, and crosscut on 200 level 14 feet.

NAVAJO.—North drift on east vein No. 2, 150 foot level, has been extended 8 feet during the past week. Have suspended work in the south drift east vein same level.

Victoria District.

GRUB STAKING.—Carson *Appeal*, Dec. 31: W. H. Burns, of this city, about a month ago purchased a good mine in the Victoria district, at Schurz, near Hawthorne. The purchase was made of Dudley and Walcott, and since the transfer, a suit has been

brought by a man named Swart, against Dudley and Walcott, who demands a third interest on the grounds that he furnished the original grub stake for the locators, and the locators never settled for the same. The ledge is fourteen inches wide and assays about \$2000 a ton, promising to become a very valuable property.

Ward District.

DESERTED.—White Pine *News*, Dec. 30: We made a hasty visit to Ward Tuesday. The old town looks almost deserted, and, to one who was there ten years ago—in the heyday of its glory—its present appearance would bring a sigh of regret for its departed glory. Of all the business houses that once adorned its street, but one remains, that of Poujade & Garaghan. Many of the buildings on Main street have been moved away, and those that remain are fast going to decay. Some four or five families still remain. Mr. Culver, Superintendent of the Martin White, is working six men on a southeast drift from the tunnel, and a few others are working a lease in another part of the mine. The mill, too, is being put in repair, and with the ore now on hand, and what is expected to be taken out, quite a run will be made in the spring. The old tailings will also probably be worked, which may give the old camp quite a prosperous season next summer.

ARIZONA.

GLOBE.—Silver *Belt*, Dec. 31: A very considerable amount of development work is being done now throughout this district. Inasmuch as the work being performed in the development of the vast resources of our most wonderful mining section here is being done by the miners themselves, without the aid of capital, and by those who, though scant of means, are steadfast in their faith in the final outcome of our camp, it certainly makes their efforts in this direction more worthy of special notice.

RICHMOND BASIN.—The West Richmond is being steadily worked by Messrs. Lowther and Woodson with results highly satisfactory to the owners. The La Plata is being worked by S. R. Sands and Cadman on a lease, and is yielding some good ore. The Mack Morris is also being worked on a lease by Hatch & Co. The Helen is leased to Uncle John Epley, who is taking out some splendid ore. The Davy Crockett mine, near the Cox & Coplin, is being constantly worked by the owners, Billings, McNelly & Co., who are taking out a large amount of ore, that will run up into the hundreds of dollars per ton. The Old Columbia mine near the above is turning out some rich ore for its owners, who have just made a shipment to Socorro, which they claim will run about \$2000 per ton. They are extracting, I am informed, a large amount of ore from the "Crank" near the Irene, about 45 tons of which has been shipped to the Miami mill for reduction. This mine is owned by J. D. McCabe and M. Whalen, but is being worked by J. C. Coplin & Co. under a lease. The assessment work for the year 1885 has been performed on the Pinal and Aztec mines, which belong to the estate of the late C. T. Mills, of Brooklyn, California. The former has a shaft 40 feet in depth that shows a vein four feet wide, which carries a carbonate ore of a good grade. One lot was milled some time since, at the Miami, that yielded 206 ounces of silver per ton. The Aztec, also, is a very promising property. The recent work on this claim uncovered a new vein four feet wide, carrying a most excellent grade of carbonate copper ore.

A PROSPECTIVE BOOM FOR SIGNAL.—Mohave *Miner*, Jan. 2: On Tuesday of last week Mr. Hugo Richards, of Prescott, passed through Kingman on his way to Signal. This gentleman has furnished most of the capital used in prospecting the Signal mine during the past year. This mine, together with the old and well-known McCracken mine adjoining it, were located about the year 1872, and a vast amount of work has been done on them at different times since, and three mills have been put up to work the ore. The McCracken is a 20-stamp mill and is now in first-class order, being ready to start up at a minute's notice. The Signal mill contained ten stamps, but ran only a short time until it was destroyed by fire. Through the efforts of Mr. Richards this mill is now being rebuilt, all of the lumber and material necessary for so doing being already on the ground. During the past year eight or ten miners have been working steadily on the Signal mine, and have found and developed a large vein of high-grade ore. The owners claim that there is already enough ore on the dump and in sight in the mine to keep the mill running for a year. We are informed that Mr. Richards will superintend all future operations in person. According to the present outlook it will be only two or three months before bullion shipments will again be made from the town of Signal.

COLORADO.

ITCH.—Tribune *Republican*, Jan. 1: The C. H. C. mine, operated during the past few months by Messrs. Watkins and James (manager and metallurgist respectively of the Pasadena Smelting Company) under lease, now carries thirty-six names on its payroll. This is the largest force on any mine here. The Princeton mine adjoining has a force of fifteen to twenty men. The Leila Davis, the Little Maggie, the Forest, the Hooe and Cross, and one or two others employ each about fourteen men. The Newman group is being operated by eight or nine different lessees, who employ collectively about fifty men. Adjacent to these mines is the Golden Age, which is undergoing constant development, as Judge Julius Thompson and Mr. A. A. Waggoner, the owners have had a force of half a dozen men at work there ever since last spring, and have taken out some high-grade ore. I was about to state that the greatest activity at present prevails on C. H. C. hill, but on reflection I find that Newman hill is as lively, that Nigger Baby hill is being actively developed, and that the eastern portion of Dolores mountain is the old stand-by, where the Leila Davis, the Little Maggie, the Black Hawk, the Corsair Chief, the Forest and several others have established a little village of boarding and bunk houses, assay shops and offices.

The Grand View Smelter is in full blast and will continue to reduce twenty-eight to thirty tons daily during the winter season. Not over two years ago the charges at these works were from \$30 to \$40 per ton. Now they are not half so excessive, and still are in excess of what they should be. Most of the ores carry a percentage of lead. At the railroad points lead is paid for at the rate of 50 cents per

unit. Here but 20 cents is allowed and nothing for the first 10 per cent. Mr. Grierson, the Superintendent, and Mr. Bryan, the metallurgist, claim, with justice, that the cost of freight base bullion to Rockwood makes this reduction necessary. But these unfavorable circumstances and measures work a hardship to the producer, though it gives employment to the freighter. The bulk of Rico's ore is low grade. Thrice the amount of ore now shipped to the smelter goes over the dumps or is stored in expectation of relief by means of a railroad.

IDAHO.

SMOKY.—Wood River *Miner*, Dec. 30: George Montgomery, who has spent the last month in Smoky, says that that region can be safely reckoned on for regular daily shipments of 20 to 30 tons, after the first of next June. Until then the shipments will be somewhat irregular, but one will come in right along, even this winter. A carload of ore is now on the way in from the King of the West, and more will follow—so that by the 15th of January he expects the most of the purchase price to have been realized from the mine. The Trade Dollar, which is located about half a mile from the King of the West, is showing eight to twelve feet of first-class concentrating ore, and Mr. Montgomery considers it the best mine in this section to-day. Its vein is massive, regular, and of uniform value. One-half of the Trade Dollar was recently purchased by Mr. Montgomery and his partner, Mr. Woodward, for \$3200. The purchase was made about three weeks ago, immediately after five feet of ore was cut into. The week before the one-half interest was offered for \$250 worth of supplies. Now a cool \$20,000 would not get it. So it is in mining.

MONTANA.

GOOD VEIN.—Helena *Independent*, Jan. 1: The Alpha and Omega received good news from their mine to-day. While sinking in the main 150-foot level, they struck a three-and-a-half foot vein of ore panning out \$60 to the ton. Work on the mill is progressing finely, and the stamps will be ready to drop in about two weeks. We understand that the Badger mine has been bonded by parties in this city for \$35,000. It is between and adjoins the Alpha and Batchelor. The Assiniboine received a few days ago another nice lot of ore from tunnel No. 2. It assays 41 ounces silver and \$28 gold, and runs 25 per cent lead, a very fine showing, as the tunnel is underground less than twenty feet. They have on the dump a considerable quantity of good ore, and expect to begin shipping soon. They had a bid to-day of \$46 per ton for their ore. They expect the mine to pay its own way from this time on, and soon show a profit. The vein is widening and growing richer as they gain depth.

NEW MEXICO.

ORE.—Socorro *Bulletin*, Jan. 2: F. H. Zeigler is dumping good ore out of his Index mine. Hite and Dahle are taking pay mineral out of their Moorehead mine. H. W. Russell is working the Marsh mine in the Pueblo district, and is raising good carbonate and galena ore. Wilson, last week, at a depth of six feet, in his Drake location, struck a five-foot body of galena and carbonate ore, running from 60 to 160 ozs. silver. The average value of the ore is 87 ozs. silver. The property is situated in the Pueblo district, and also yields 3 ozs per ton in gold. The Graphic mine is being worked incessantly, and both it and the Greyhound are steadily shipping ore to the Graphic smelter in this city. The Lady Franklin mine of Kingston, is the seat of continuous and important work. Its high-grade ore is shipped steadily to the Billings works of this city for treatment. The Merritt M. and M. Co.'s 10-stamp mill in this city fired up and dropped its stamps on last Tuesday afternoon. In the vicinity of the hopper an immense pile of mineral awaits treatment. The Merritt mine continues to be worked by two shifts of 15 men each, and the ore is shipped daily to the mill. It is making a fine record; the quality of the ore is improving in its silver value and the ore bodies are enlarging.

OREGON.

PLACER AND QUARTZ.—Jacksonville *Times*, Jan. 2: Many of the miners have a good supply of water and are making the most of it. John Miller has his mines on Farmer's flat in full blast, having a full head of water. The water supply has been replenished by this week's rains, which were quite timely. Prospectors may be seen everywhere nowadays, some of whom will surely make a rich strike. Messrs. Orth and Linn are prospecting their quartz ledge on Applegate on an extensive scale. Miners are generally busy. This promises to be the best mining season we have had for many years. Cal. Cunningham and John Bardsell struck a fine ledge of quartz on Dan Fisher's homestead recently. J. R. Bailey of Applegate informs us that Jack Layton intended commencing operations with his lower ditch this week. A. Chale, R. N. Baker and others have a quartz ledge on Jackson creek which prospects well and promises to be extensive. The miners of Josephine county have more water than they have had in several years and they are making the most of it. All are busy. John C. Ruck of the Willow Springs district informs us that several important quartz discoveries have been made recently in that section. Keaton & Klippel of Poorman's creek, have an abundant supply of water and commenced working day and night this week. The Chinese have taken possession of the mines sold them by the Applegate Gravel Co. Boyd & Johnson are sinking a new shaft on their claim in Blackwell district. Chas. Nail and J. N. Casteel have located some very promising ground on Applegate and will soon commence digging a ditch that will furnish them a good supply of water. A number of the citizens of Jacksonville have formed a company and set some men to thoroughly prospect the old Bowden ledge on Jackson creek. This mine was worked at a considerable profit many years ago, but petered out after a time. There are a large number of ledges in the vicinity of Jacksonville, and in other places in southern Oregon, that were long ago abandoned as unprofitable property, which will loom up now that the improved processes of crushing ore have revolutionized everything. We may therefore look for good reports as soon as the mill is able to test the quartz. A portion of the large, new quartz mill Brown & Co. intend putting up at this place arrived at Central Point the forepart of the week and will be hauled up at once.

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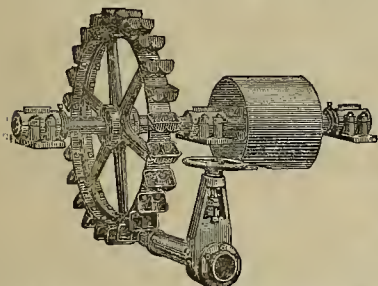
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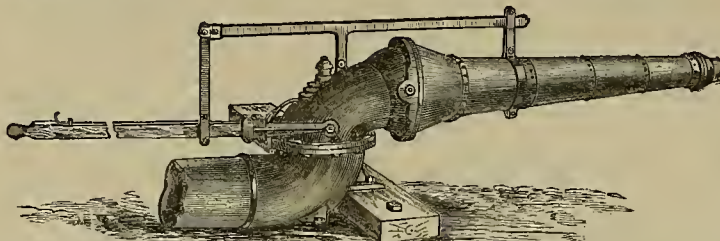
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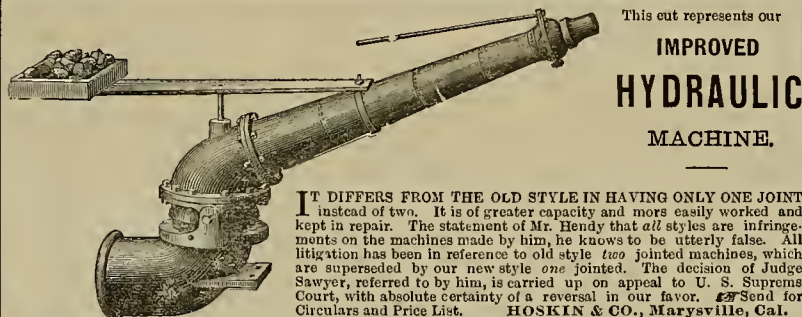
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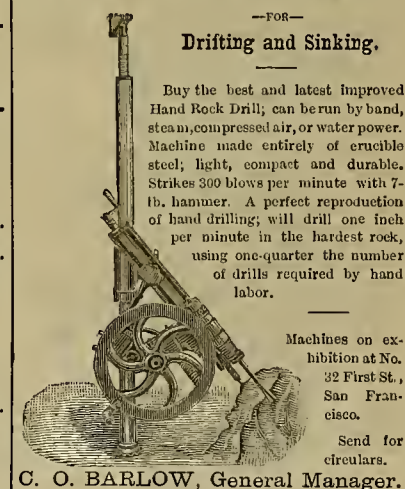
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FOR WEEK ENDING DECEMBER 29, 1885.

- 333,287.—WINDOW HANGING—C. Dellenbeck, Portland, Ogr.
- 333,204.—APPARATUS FOR STEAMING PILES—John Dolbeer, S. F.
- 333,119.—PIPE FOR FLOORINGS, &c.—F. Ephriam, S. F.
- 333,211.—STANDARD FOR MAPS—J. S. Fox, Oakland, Cal.
- 333,124.—HARVESTER—C. Gratian, Stockton, Cal.
- 333,219.—ELECTRIC LAMP—A. Harding, Oakland, Cal.
- 333,416.—SAFETY STOP FOR FIRE ARMS—J. C. Kelton, S. F.
- 333,233.—FARE BOX—Landgrane & Willis, S. F.
- 333,416.—PROPULSION OF CARS AND VEHICLES—Landgrane, Schetzel & Willis, S. F.
- 333,235.—GLASS TUBE CUTTER—S. G. Lawson, Portland, Ogr.
- 333,238.—WARDROBE AND TRUNK—C. Lempert, Jacksonville, Ogr.
- 333,336.—GAS ENGINE—D. S. Regan, S. F.
- 333,169.—PAINT—J. Sackhouse, Stockton, Cal.
- 333,265.—CODLING MOTH TRAP—George W. Thissell, Winters, Cal.
- 333,491.—RIDING SADDLE—A. M. Wallace, Globe, A. T.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co. in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Miscellaneous.

MONTANA and Dakota are both desirous of becoming States.

The King mine, at Lone Mountain, Elko county, has been sold for \$10,000.

It is calculated that 193,175 tons of coal were shipped from Seattle in 1885.

The miners in the Bonanza mines at Quijotoa, A. T., refuse to accept \$3 a day, and have gone on a strike.

A CONVENTION of steel-makers is to be held at Pittsburgh, Pa., to consider the question of prices and wages.

The Wenban mill and mining property at Cortez, Nev., has been bonded to San Francisco capitalists for \$1,200,000.

The monthly pay-rolls for labor in the mines of Eureka district and at the two reduction works in town will aggregate not over \$35,000.

A COMPLAINT has been filed at Stockton against Calaveras miners to enjoin the deposit of tailings and slickens in Chili gulch, a tributary of the Calaveras.

THE Port Townsend *Argus* says: Charles Morrison, who lives near Irondale, has discovered an extensive deposit of iron ore on his land. He will probably realize on it handsomely some of these days.

THREE is a mining boom in Julian, San Diego county. New mines are being opened up, and old mines are yielding better than ever. There was quite an excitement over the discovery of this camp in 1870.

THE Los Angeles City Council has granted Charles H. Howland and associates a franchise for the laying of a double track for an electric or steam railway, the work to begin within 90 days and be completed in three years.

THE Barber canyon placer mines, near Dun Glen, Nev., are not turning out as well as anticipated. Water is encountered before the bed rock is reached, and the Chinese, who are working the mines, cannot control it.

Lane Lectures.

The fourth course of Popular Lectures at Cooper Medical College, corner Sacramento and Webster streets, S. F., will be delivered during the coming winter. As has been announced before, these lectures are free. No ticket of admission is required. The following is a list of the times, place and subjects of lectures.

Jan. 8, 1886, Professor L. C. Lane, "The Medicine of the Prophet;" Jan. 22d, Prof. C. N. Ellinwood, "The Blood;" Feb. 5th, Prof. A. Barkan, "The Prevention of Blindness;" Feb. 19th, Prof. J. H. Wythe, "What is an Egg?" March 5th, Doctor John F. Morse, "Something About Hospitals;" March 19th, Prof. Chas. H. Steele, "Opium;" April 21, Prof. J. O. Hirschfelder, "Digestion and Indigestion;" April 16th, Prof. Henry Gibbons, Jr., "The Foot;" May 7th, Prof. W. D. Johnston, "Electricity;" May 21st, Prof. W. D. Johnston, "Electricity."

WORKING PEOPLE AND THEIR EMPLOYERS.—By Washington Gladden. 12mo, 241 pp., paper. Price 25 cents.

"This book we cordially commend. It is sound and economic in principle, and Christian in spirit."—N. Y. *Examiner*.

We will furnish (within 30 days at farthest) the above work, post-paid, at half price to new or old subscribers on paying for this paper up to one year in advance of this date. See our offer of desirable books on similar terms, inserted from time to time in this paper.

THE MINING AND SCIENTIFIC PRESS, of San Francisco, has entered upon its 521 volume. It is the oldest mining journal in the United States and one of the best.—*Tuscarora Times-Review*.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.										
COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.		
Bulwer Con M Co.	California.	2.	20.	Oct 29.	Dec 10.	Jan 20.	W. Willis.	309 Montgomery St		
Bulcher Con M Co.	California.	3.	30.	Dec 23.	Jan 25.	Feb 27.	J. Connor.	501 Sansome St		
Chollar M Co.	Nevada.	19.	50.	Dec 30.	Feb 4.	Feb 25.	C. E. Elliott.	309 Montgomery St		
Champion M Co.	California.	20.	10.	Dec 23.	Jan 25.	Feb 16.	T. Wetzel.	532 Montgomery St		
Daisy Cement M Co.	California.	5.	02.	Nov 19.	Dec 23.	Jan 27.	C. J. Collins.	512 Montgomery St		
Eureka Con M Co.	Nevada.	8.	1.	Dec 18.	Jan 21.	Feb 10.	E. H. Wilson.	323 Montgomery St		
General L & M Co.	Arizona.	7.	01.	Nov 25.	Jan 9.	Feb 8.	C. E. Gillet.	638 Montgomery St		
Golden Fleece M Co.	California.	4.	20.	Dec 9.	Jan 15.	Feb 5.	F. Schmeider.	Phelan Block		
Gould and Curry S M Co.	Nevada.	51.	25.	Dec 4.	Jan 8.	Feb 1.	A. K. Durlow.	309 Montgomery St		
Hathaway Hyd M Co.	California.	8.	45.	Dec 8.	Jan 18.	Feb 8.	J. H. Moore.	Montgomery Block		
Mexican Development Co.	Mexico.	2.	10.	Dec 9.	Jan 10.	Feb 1.	A. G. Nunez.	708 Montgomery St		
Manhattan M Co.	California.	18.	10.	Dec 10.	Jan 12.	Jan 30.	A. B. Brady.	Grass Valley		
North Banner M Co.	California.	9.	01.	Dec 8.	Jan 9.	Jan 27.	T. J. Whelan.	Grass Valley		
Norta Gould & Curry M Co.	Nevada.	9.	20.	Nov 23.	Dec 24.	Jan 11.	C. H. Mason.	331 Montgomery St		
Pennsylvania Con M Co.	California.	3.	05.	Dec 8.	Jan 8.	Jan 25.	M. Byrne Jr.	Grass Valley		
Pine Tree M Co.	California.	21.	15.	Dec 22.	Jan 27.	Feb 15.	C. A. Bunting.	309 California St		
Potosi M Co.	Nevada.	21.	30.	Dec 1.	Jan 7.	Jan 28.	C. E. Elliott.	628 Montgomery St		
Russel Reduction & M Co.	California.	1.	25.	Oct 15.	Dec 29.	Jan 19.	J. Morizio.	323 Montgomery St		
Savage M Co.	Nevada.	65.	50.	Jan 4.	Feb 9.	Mar 1.	E. B. Holmes.	309 Montgomery St		
Virginia Creek Hyd M Co.	California.	5.	05.	Dec 14.	Jan 19.	Feb 11.	J. M. Quay.	406 Montgomery St		

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Argenta M Co.	Nevada.	E. M. Hall.	327 Pine St.	Annual.	Jan 11
Alta M & M Co.	Alaska.	J. Freeborn.	306 Pine St.	Annual.	Jan 12
Ben Nevie M Co.	Nevada.	J. Deane.	309 Montgomery St.	Annual.	Jan 14
Kosuth M Co.	Nevada.	C. K. Sturtevant.	323 Montgomery St.	Annual.	Jan 11
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	Annual.	Jan 12
Selby Smelting Co.	California.	Called by Directors.	416 Montgomery St.	Special.	Jan 22
Tyrolse M & Smelting Co.	California.	F. Frankenthal.	16 Sutter St.	Annual.	Jan 11

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Cal donia M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Dec 24
Jackson M Co.	California.	D. C. Bates.	418 California St.	10.	Oct 5
Manhattan S M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Dec 15
Syndicate M Co.	Nevada.	J. Stadfeld Jr.	419 California St.	10.	Dec 24

PACIFIC COAST WEATHER FOR THE WEEK.

[Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.]

DATE.	Portland.				Red Bluff.				Sacramento.				S. Francisco.				Los Angeles.				San Diego.			
	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.
Dec. 30-Jan. 6.																								
Thursday .....	.20	38	S	Fr.	.00	43	N	Cl.	.00	43	NW	Fr.	.00	53	NW	Cl.	.00	59	SE	Cl.	.00	61	S	Fr.
Friday .....	.00	31	S	Cy.	.00	46	N	Cl.	.00	46	NW	Cl.	.00	52	N	Cl.	.00	57	N	Cl.	.00	59	NW	Cl.
Saturday .....	.00	32	W	Cy.	.00	46	N	Fr.	.00	45	S	Cl.	.00	60	NE	Fr.	.00	53	SE	Cl.	.00	57	W	Cl.
Sunday .....	.00	45	SE	Cy.	.00	44	NW	Cl.	.00	42	NW	Cl.	.00	50	N	Cl.	.00	51	N	Cl.	.00	57	NW	Cl.
Monday .....	.14	48	S	Cy.	.00	46	N	Cy.	.00	43	NW	Cl.	.00	53	N	Cl.	.00	63	SW	Cl.	.00	59	SW	Cl.
Tuesday .....	.64	45	S	Cy.	.00	44	S	Cl.	.00	33	SE	Fy.	.00	50	SE	Cl.	.00	62	SE	Cl.	.00	61	NW	Cl.
Wednesday .....	.03	40	W	Fr.	.00	50	N	Cl.	.00	50	SW	Cl.	.00	49	N	Cl.	.00	59	N	Cl.	.00	60	W	Cl.
Totals	1.08				.00				.00				.00				.00				.00			

EXPLANATION.—Cl. for clear; Cy. cloudy; Fr. fair; Fy. foggy; — indicates too small to measure. Temperature wind and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 17.	WEEK ENDING Dec. 24.	WEEK ENDING Dec. 31.	WEEK ENDING Jan. 7.
Alpha.....	.15	.40	.15	.20
Andes.....	.20	.15	.20	.15
Argenta.....	1.00	.90	.95	1.05
Bulcher.....	.10	1.20	1.25	.85
Bullion.....	.20	.25	.30	.25
Bonanza King.....	1.60	1.55	1.70	1.75
Bodie Con.....	1.60	1.55	1.70	1.75
Benton.....	1.05	.75	.85	.90
Bodie Tunnel.....	.45	.60	.55	.60
Bulwer.....	.45	.60	.55	.60
California.....	1.25	1.30	1.35	1.55
Challenger.....	.15	.15	.15	.15
Champion.....	.85	1.00	.70	.80
Chollar.....	.85	1.00	.70	.80
Confidence.....	.90	.85	.85	.85
Con. Imperial.....	.75	1.15	1.25	1.15
Con. Virginia.....	.75	1.15	1.25	1.15
Con. Pacific.....	.65	.70	.45	.50
Crown Point.....	.95	1.15	.70	.80
Day.....	.90	.90	.90	.90
Eureka Con.....	2.10	2.25	1.00	1.40
Eureka Tunnel.....	2.10	2.25	1.00	1.40
Exchequer.....	.20	.15	.20	.15
Grand Prize.....	.75	.75	.75	.75
Gould & Curry.....	.65	.75	.75	.75
Goodshaw.....	.45	.45	.45	.45
Hale & Norcross.....	3.50	4.25	3.80	4.20
Holmes.....	.94	1.11	1.11	1.11
Independence.....	.65	.05	.05	.05
Julia.....	.65	.05	.05	.05
Justice.....	.65	.05	.05	.05
Martin White.....	.35	.45	.40	.45
Mono.....	3.50	4.45	4.00	4.15
Mexican.....	.55	.60	.55	.60
Mt. Diablo.....	.55	.60	.55	.60
Northern Belle.....	.45	.35	.35	.35
Nevado.....	.45	.35	.35	.35
North Belle Isle.....	.75	.75	.75	.75
Occidental.....	.75	.75	.75	.75
Ophir.....	.75	.75	.75	.75
Oreman.....	.15	.25	.15	.20
Potosi.....	.15	.25	.15	.20
Pinal Con.....	1.65	1.80	1.60	1.70
Savage.....	1.65	1.80	1.60	1.70
Seg. Belcher.....	.60	1.80	.55	.65
Sierra Nevada.....	.60	1.80	.55	.65
Silver Hill.....	.60	1.80	.55	.65
Silver King.....	.60	1.80	.55	.65
Scorpion.....	.60	1.80	.55	.65
Tigra.....	.40	.45	.40	.45
Union Con.....	.40	.45	.40	.45
Utah.....	.55	.65	.50	.60
Yellow Jacket.....	.70	1.15	.60	.70

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Jan. 7.	1650	Hale & Norcross	1.60	@1.75
10 Bullion	25c	50 Holmes	10.50	
150 B. & Belcher	75c	100 Mexican	35c	
250 Bodie Con	1.90	50 Mono	4.90	
100 Bulwer	55c	200 Ophir	60c	
100 Chollar	70c	20 Potosi	15c	
100 Crown Point	75c	200 Savage	65c	
200 Con. Pacific	45c	750 Sierra Nevada	40c	
1350 Con Va. & Cal.	1.60	400 Scorpion	85c	
200 Gould & Curry	70c	70 Union Con	30c	
100 Goodshaw	25c	165 Yellow Jacket	25c	

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (enclosing one cent only will suffice). We will not knowingly send a paper to anyone who does not wish it, but if it is continued through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco:

PHENIX M. & Co., Jan. 6th.—Capital stock, \$1,000,000. Directors: William B. Robertson, N. M. Bell, William B. Brison, W. C. Brown and Thomas W. Chinn.

CAPAZON LAND AND WATER CO., Jan. 6th.—Object, buying and selling lands, and for irrigating lands in San Bernardino and San Diego counties. Capital stock, \$128,000. Directors: E. J. Pringle, Thomas E. Pope, George C. Boardman, William J. Swyne, George W. Spencer.

PACIFIC TANNERS' ASSOCIATION, Jan. 6th.—Object, carrying on the business of tanning leather in all its departments and dealing in hides, leather, tallow, etc. Capital stock, \$500,000. Directors: John C. Rued, Anton Krieg, Hermann Kullman, Jacob Eberhard, Thomas McKay, Jacob Salz and Maurice Goetz.

HALLECK CATTLE CO., Jan. 5th.—Object, to deal in horses and cattle in Nevada and Montana. Capital stock, \$450,000. Directors: John F. Boyd, Joseph Scott, William Willis, William S. Wood and L. Osborn.

NORTHERN CATTLE CO., Jan. 5th.—Object, to deal in horses and cattle in Nevada and Montana. Capital stock, \$450,000. Directors: J. F. Boyd, Joseph Scott, William Willis, William S. Wood and L. Osborn.

DELTA M. CO., Dec. 30th.—Location, Shasta Co., Cal. Capital stock, \$2,000,000. Directors: John Bell, Parker Crittenden, Thomas Bussy, F. K. Gallagher and G. Adams.

Mining Share Market.

The holidays took a couple of days time from the stock board, but this week, while its sessions have been held, nothing of special moment has occurred. On the Comstock, the sinking of the Combination shaft deeper for the 3200 level is progressing well, and is over 50 feet below the 3100 level. The proposed sinking of the Osbiston shaft deeper will be commenced in a few days. Very little may be expected in the way of practical ore development until this already deepest shaft on the American continent shall have attained its proposed immediate future depth of 3200 feet. At that level it is thought that a good ore body will be found, and for this purpose the Osbiston shaft of the Gould and Curry and Best and Belcher mines is to be sunk deeper, in order to connect and intersect at a corresponding lowest level by means of lateral drifts south.

The following mining companies report a cash balance on hand December 31, 1885, as per sworn statements filed in their respective offices: Alta, \$8,388.95; Benton Con., \$390.33; Ophir, \$12,660.20; Gould & Curry, \$3,683.75; Utah, \$7,173.31; Con. California & Virginia, cash \$94,367.52 and unsold bullion \$32,762.99; Alpha, \$4,156.47; Bulwer, \$17,552.72; Best & Belcher, \$11,523.33; Chollar, \$6,380.28; Mexican, \$8,758.49; Occidental, \$2,682.27; Sierra Nevada, \$6,813.46; Exchequer, \$7,397.02; Holmes, cash \$4,664.83 and \$40,901.08 assay value of unsold bullion on hand, indebtedness of company \$26,282.82; Crown Point, \$26,941.33.

Bullion Shipments.

Oro Grande Mill, Jan. 3. \$4437; Koebig's Mill, 3, \$700; Germania, Dec. 30, \$8265; Lead Mine, 30, \$1100; Kentuck, 31, \$10,000; Vienna, 31, \$1752; Bannock, 31, \$1682; Alice, 31, \$11,513.

Following were the ore and bullion shipments from Salt Lake City for the week ending Jan. 2: Twenty cars of bullion, 481,365 pounds, and 25 cars of ore, 704,780 pounds.

Missing Papers.

We mail and send our papers to subscribers as carefully and regularly as possible, but changes occurring sometimes in our mailing hands, by illness or otherwise, or changes in the Postoffice here or at the place of delivery, may cause irregularity in the receipt of the paper by the subscriber. We therefore request that *always*, when subscribers fail to receive their paper, in due time that they notify the office by postal card or letter, and we will, if possible, remail all missing numbers.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

NOVELTIES just received at Muller's optical depot, 135 Montgomery St., near Bneh. x

Newspaper Agents Wanted.

Extra inducements will be offered for a few active canvassers who will give their whole attention (for a while at least) to soliciting subscriptions and advertisements for this journal and other first-class popular newspapers. Apply soon, or address this office, giving address, age, experience and reference.—DEWEY & Co., Publishers, No. 252 Market St., S. F.

Market Reports.

Lumber at Wholesale.

The Redwood Lumber Association has established no prices since the first of the year.

Redwood.—Cargo prices are at present as follows: Rough, merchantable, 2 M. R., \$13.00; rough, clear and surfaced, \$23.00; 1x10 Rustic, No. 1, \$24.00; 1x10 Rustic, No. 2, \$19.00; 1x3 V. Rustic, No. 1, \$22.00; 1x6, tongued and grooved, \$21.00; 1x4, tongued and grooved, beaded, \$23.00; 4-in. x 8, Battens (board measure), \$20.10; Shingles, 4 M., \$1.65.

Pine.—Rough, \$15.00; No. 2, \$12.00; do do in lengths, \$13.00; rough, 40 to 50 ft lengths, \$18.00; do do to 60 ft, \$17.00; T and G Flooring, 1x6, \$26.00; do do 1x8, \$28.00; do do 1x4, \$25.00; do do No. 2, \$21.00; Vertical Grain T. and O. Flooring, 1x6, \$30.00; do do do 1x8, \$32.00; Stepping, \$27.50; Furring, 1x2, per lineal ft, 3 c.

Lumber at Retail.

Prices fixed by the association April 1st. are as follows:

Pine, Rough, 12 00
" No. 2, 11 00
" 40 to 50 ft lengths, 13 00
" 50 60 " 17 00
T. & G. Flooring 1 x 6, 28 00
" 1 x 8, 30 00
" 1 x 4, 23 00
" No. 2, 21 00
Vertical Grain T. & O. Flooring, 1 x 6, 30 00
" 1 x 8, 32 00
Stepping, 27 50
Furring, 1 x 2, per lineal foot, 03
Redwood, Rough, 17 00
" No. 2, 13 00
" Surfaced, 30 00
" 1 x 8, 32 00
" 1 x 6, 29 00
" T & O. 6 in. 12 ft. and over, 25 00
" " 7 to 12 ft., 25 00
" " under 7 ft., 20 00
" Rustic, 30 00
" No. 2, 25 00
" T. & O. Beaded 12 ft. and over, 30 00
" " 7 to 11 ft., 25 00
" " under 7 ft., 20 00
" Siding, 4 in., 22 50
Pickets, Fancy, 25 00
" Rough Pointed, 15 00
" Square, 14 00
Battens, 1 x 3 per lineal ft., 02
Shingles, 1x6, 2 00
Laths, 1x1, 3 25
" 1x2, 3 75
Dunnage Boards less 5% delivered, 16 00
Price subject to change without notice.

Coal.

PRICES "TO ARRIVE."

Per Ton.	Per Ton.
Australian \$8 00 @ 6 1/2 Cardiff \$8 75 @ 7 00	
Liverpool Steam 6 25 @ 5 75 Lehigh Lump, 13 50 @ 14 00	
West Hartley, 7 00 @ 7 25 Cumberland bk 8 00 @ 8 25	
Scotch Splint, 6 50 @ 6 75 Egg, hard, 10 00 @ 10 50	

SPOT PRICES.

Per Ton.	Per Ton.
Australian \$8 75 @ Cardiff \$7 00	
Liverpool Steam 5 75 Lehigh Lump, 14 00	
West Hartley, 7 50 Cumberland, bulk, 8 50	
Scotch Splint, 6 75 Egg, hard, 10 50	

Iron.

PRICES "TO ARRIVE."

Per Ton.	Per Ton.
Eglington \$21 50 Clay Lane White \$22 00	
Oleangrook 22 50 American Soft No. 1, 23 00	
Shotts No. 1, 24 00	

SPOT PRICES.

Per Ton.	Per Ton.
Eglington \$22 50 American Soft No. 1, \$24 00	
Oleangrook 23 00 Clipper Cap, Nos. 1	
Shotts No. 1, 24 50 to 4, 22 00 @ 23 50	
Clay Lane White, 24 00	

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Jan 7, 1886.

ANTIMONY—Per pound, 12 00	
Hallet's, 13 00	
Cookson's, 13 00	
BORAX—Refined, 62 00 @ 81	
IRON—Glenbrook ton, 23 00 @	
Eglington, ton, 22 00 @	
American Soft, ton, 24 00 @	
Oregon Pig, ton, 22 00 @	
Clipper Cap, Nos. 1 & 4, 22 00 @ 23 50	
Clay Lane White, 24 00 @	
Shotts, No. 1, 24 00 @	
STEEL—English, B., 16 00 @	
Black Diamond, ordinary sizes, 13 00 @	
Plow, 1 00 @ 5	
Machinery, 8 00 @ 10	
Sanderson Bros., 13 00 @	
COPPER—	
Braziers sizes, 20 00 @ 22	
Fire-box sheets, 20 00 @	
Bolt, 20 00 @	
Yellow Metal, 12 00 @ 13	
Ingot, 12 00 @ 13	
LEAD—Pig, 4 00 @ 4 50	
Bar, 4 50 @ 5 00	
Pipe, 4 00 @	
Sheet, 7 25 @ 7 10 lb. less case, 7 00 @	
Shot, discount 10% on 500 bag Drop, 1 85 @	
Buck, 1 00 @	
Chilled, do, 2 25 @	
ZINC—German, 7 00 @ 10	
Sheet, 7 25 @ 7 10 lb. less case, 7 00 @	
QUICKSILVER—By the flask, 30 00 @ 31 00	
Flasks, new, 1 05 @	
Flasks, old, 85 00 @	
TELETYPE—Coke, 5 15 @ 5 40	
Charcoal, 6 15 @ 6 25	
NEW YORK PRICES—	
California Borax, 7 00 @ 8	
Pig Iron, American, 16 00 @ 18 50	
Quicksilver, 44 00 @ 44 44	
Bar Silver, 1 01 1/2 @	
Lead, 4 10 @ 4 15	
Copper, 11 25 @ 11 37 1/2	

Please Remit.

We would call the attention of patrons who have not yet remitted their subscriptions for 1886, to the "List of Inducements" at present offered in our columns, and urge all who can to remit to us at this time. We are not only in need of that which is due to date, in making settlements, but can use to great advantage remittances for the next year, in making improvements and better arrangements for the future. Those who do not wish to select their premiums at the time of making payment, will, if they so request, receive certificates whereby they can order premiums at any time within six months.

THE Los Angeles City Council has been asked for a franchise for the construction of a double-track electric street railroad some twelve miles long. It is estimated that the road will cost about \$30,000 a mile.

Inducements to Subscribers.

To favor subscribers to this paper, and to induce new patrons to try our publication, we offer the following advantages to all new subscribers who pay one year in advance, or present subscribers who will pay their subscriptions up to a date fully one year in advance of the present time. We will furnish the following articles (while this notice continues), at the reduced rates named, viz.:

- 1.—World's Encyclopedia, 704 pages, with 1,200 illustrations, worth \$1.75. Postpaid for 50 cts.
- 2.—Patent Binder (cloth cover) with name of this paper in gilt. Postpaid for 50 cts. \$1.00
- 3.—To New Subscribers, 12 select back Nos. of the MINING AND SCIENTIFIC PRESS. Free .75
- 4.—Any of Harper's first class periodicals, 15 per cent less than regular rates.
- 5.—Frank Leslie's and most other U. S. periodicals, 15 per cent discount from regular rates.
- 6.—Pacific Coast and Eastern Dailies, Books and Periodicals, except special publications, we can usually give 10 to 15 per cent less than advertised retail rates.
- 7.—Picturesque Arizona, 350 pages, in cloth and gilt. Postpaid for 25 cts. 1.25
- 8.—California, 100 pages, Magazine, 1880 to 1882 (3 Vols.) single Nos. Postpaid for 3 cts. .35
- 9.—For volume, unbound, 5 Vols., Postpaid for 20 cts. 2.00
- 10.—Per volume, bound, cloth back and stiff paper sides. Postpaid for 40 cts. 2.50
- 11.—Picturesque California Homes (40 building plans and estimates). Postpaid for \$1 35
- 12.—Dewey's Patent Newspaper File Holder (18 to 30 inch). Postpaid for 25 cts. .50
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AGRICULTURAL AND MINERAL LANDS.—A dispatch from Oroville on Tuesday cites an important decision by Judge Freer, that the United States patent to the railroad company carried with it all the minerals not known to exist at the date of its issuance. This decision follows a recent one of the Supreme Court of the United States, and disposes of a question which has long kept the agricultural title in mineral sections in dispute and litigation.

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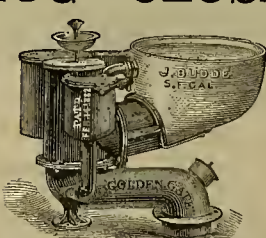
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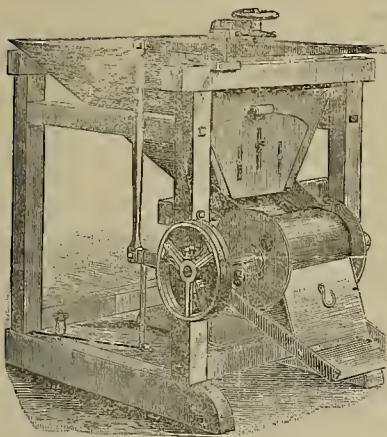
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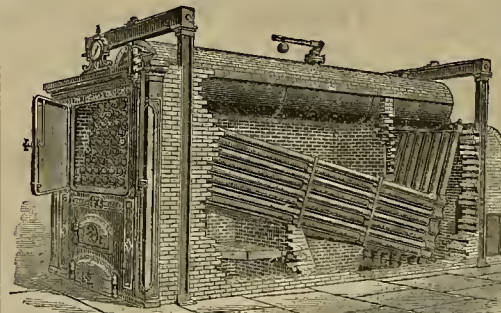
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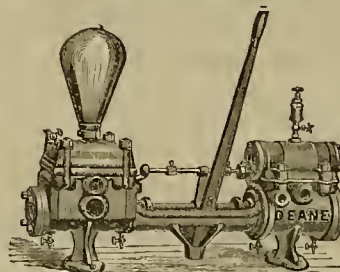
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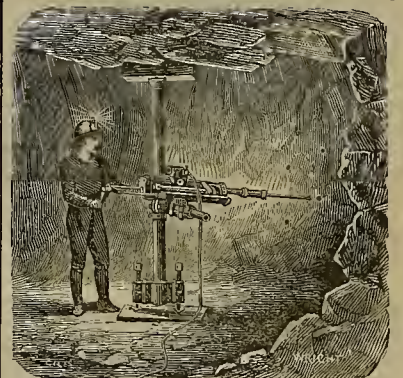
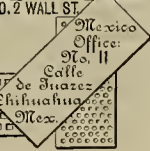
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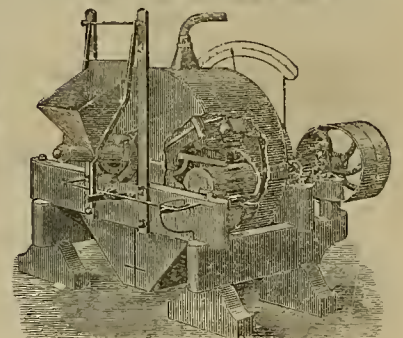
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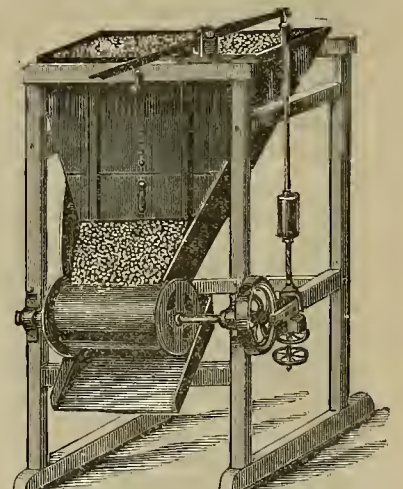


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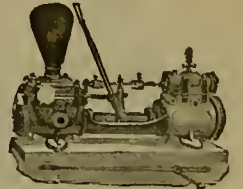
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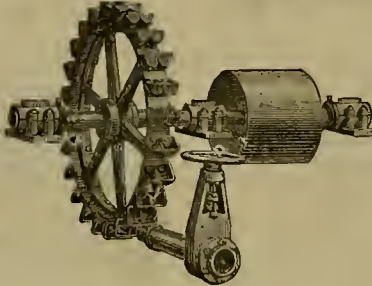
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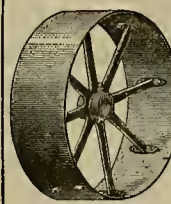
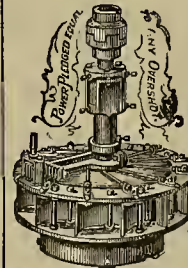
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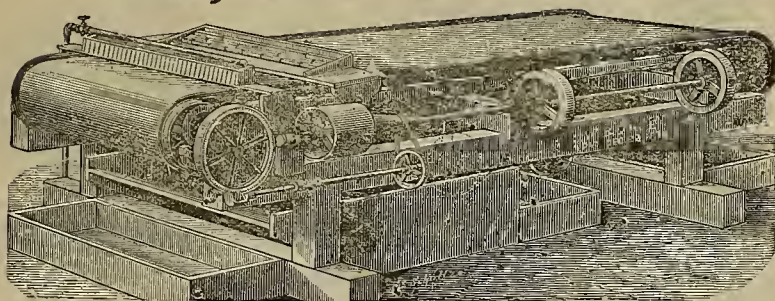
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As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

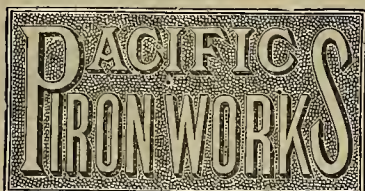
Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

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Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.



1850.

1885.

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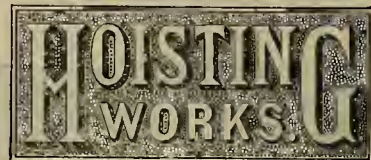
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These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

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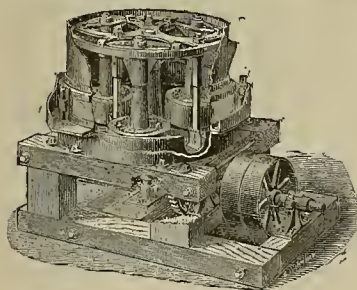
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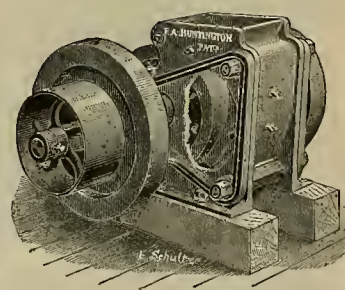
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 16, 1886.

VOLUME LII
Number 3.

Determination of Rock-forming Minerals.

There are two methods of examining rocks, the macroscopical and the microscopical.

In the macroscopical investigation of rocks, those parts of the mineral mixture discernible with the naked eye can be studied with reference to crystalline form, cleavage, color, luster, streak, hardness, solubility, or acids, etc. For the more exact optical investigation, however, cleavage sections exactly orientated must be obtained, the cleavage angle, when possible, measured, in order to determine the plane of cleavage, and the section, if not already transparent, ground thin. Such an investigation of the rocks-forming minerals leads in most cases to the goal, provided the particles have a certain magnitude.

Isolated particles of minerals can be examined before the blow-pipe; yet, because of their minuteness, such a purely macroscopical examination is insufficient in most cases. This is especially true in porphyritic or very fine-grained rocks, and therefore for these rocks the microscopical examination is employed. It is necessary in such a case that the pieces of rock under examination shall be ground into thin transparent leaves. In such sections the single constituents are cut in most varied directions. By these minute cross sections the crystals and the rock-forming minerals can be determined by optical methods with the polarization microscope, and by combination of the optical with the crystallographical properties, *i. e.* with the form of the cross section, that is, crystalline form and cleavage.

This determination is more difficult if the minerals occur only as grains. Of course here also the human eye has its limitations; if the separate particles are so minute that they cannot be observed in section, that is, afford no cross sections; or, when examined under the highest possible magnifying power they give no figures suitable—large enough—for optical study, then determination by the polarization microscope is impossible.

A very complete work on the "Determination of Rock-forming Minerals," by Dr. Eugen Hussak, of the University of Graz, has been translated from the German by Dr. E. G. Smith, of Beloit college, Wisconsin, and published by John Wiley & Sons, of New York. In this book is given a description of the method of producing preparations from rocks suitable for microscopical study; of the application of the polarization-microscope adapted to the complete exposition of the optical and chemical methods of determination; then follows a discussion of the mechanical separation of the rock constituents according to their specific purity and by the electro magnet; and, finally, a short chapter on the structure of the rock-forming minerals, and a systematic survey of them. The tables for determining minerals are very complete and well arranged. The book is illustrated. A very important chapter to students of mineralogy is that giving the bibliography. The whole work is a very useful one to mineralogists, for reference. Heretofore books of this character have only been accessible to those conversant with German or French, so that the English translation will probably be largely used.

INYO and San Bernardino are the two principal silver producing counties in the State,

Deep Mining.

It was at one time thought that very deep mining had been tested on the Comstock and found to be unprofitable. The difficulty has been in single companies undertaking the expensive work, but now that there is concert of action, with a general system, better results are looked for. Ventilation and drainage are the two great requisites in deep mining work. It was to procure these important adjuncts that

Savage north line, which will eventually connect with the drift now being run north on the 3100 level of Hale & Norcross, and which has about reached the Savage south line. This new work is very important to this section of the Comstock, and if results are favorable other deep explorations may be carried on.

Lixiviation by Aid of Suction.

In answer to a correspondent we may state

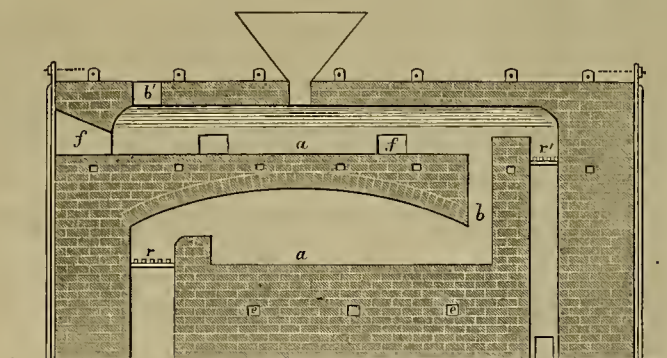


VAT FOR LEACHING BY SUCTION.

the Combination shaft was started some years ago by the Savage, Hale & Norcross and Chollar-Potosi Companies, each of which had its own shaft, but was unable to sink any deeper through it. The Combination shaft has enabled the ledge to be explored to the depth of 3100 feet, and it is possible to go several hundred feet deeper through its aid.

Now, the Best & Belcher Mining Company having agreed to join with the Gould & Curry

that lixiviation with aid of motion is of great advantage where it can be arranged. The leaching boxes must be located 10 or 12 feet above the precipitating vats. The arrangement is as shown in the cut. The hose *c* is inserted at the lowest point of the vat below the false bottom; then there is a glass pipe *d* reaching outside near the rim of the vat. The hose, before commencing, is likewise lifted as high as the glass tube. The first staves on the bottom



DOUBLE FURNACE FOR ROASTING SULPHURETS.

in sinking the Oshiston shaft deeper, to correspond and communicate with the lowest levels of the Combination shaft and the Chollar, Norcross and Savage mines, 3200 feet below the surface, this work is to be actively prosecuted further under Superintendent D. B. Lyman, official orders having been given to that effect. In compliance therewith, the ponderous and effective machinery at the works is being put in working condition, and the humps are to be started up directly to take out the water, preparatory to sinking the shaft deeper. The difference in the surface level of the two shafts being 171 feet, the Oshiston shaft will have to be sunk 3029 feet in order to correspond with the 3200 level of the Combination shaft. This is necessarily the work of some months. The work on the Oshiston shaft was suspended after being sunk to 2700 feet. A winze will be sunk on the 2500 level of Gould & Curry, near the

of the vat are represented by *a* and the second row by *b*, which is covered with the cloth. After the vat is filled with ore and the water admitted, the air below the false bottom escapes through both pipes; but after a while when the water rises and covers the mouth of the hose, the air between the upper staves goes through the glass tube, and is followed by the water. When this reaches the water level inside the tank, the tube is shut by a tight stopper, and the hose lowered down to the precipitating vats. The lixiviation is much quicker than without suction, but the hose should not be too large.

LOCAL astronomers were disappointed on Saturday night in not obtaining observations desired of Saturn and *Mu Geminorum*. The small star could not be seen, the atmospheric conditions being unfavorable.

Sulphuret Roasting Furnace.

There is considerable interest just now in this State and elsewhere on the subject of furnaces for roasting sulphurets. We give an engraving showing, in longitudinal section, a form of double roasting furnace for this purpose which Mr. Deetken, who has had long experience in roasting sulphurets in California, told the late Mr. Kustel he considered superior to the long ones or others he had used.

The lower hearth, *a*, is nine feet long and 10 feet wide. The roof in the center is 28 inches, and at the flue-bridge 14 inches above the hearth. The fire-place, *r*, is 20 inches wide, 8 feet long and 20 inches from the roof. The flue, *b*, ascends to the upper hearth, *c*; the working door is on the back side. In case there should be required more heat than is obtained from the lower hearth, there is an auxiliary fire-place, *r'*. The flame goes through the flue, *b*, into the dust chambers. These chambers have cross-petitions lengthwise, by which the draught is forced to take a longer way before it enters the chimney. From the upper hearth the ore is drawn through the flue, *b*, to the lower hearth; *ee* are canals for the escape of moisture, and *e'e'* for the tie-rods. The two hearths can be used separately, if desired.

This furnace, although somewhat inconvenient for the roasters, has the advantage of taking up less space, and as the ore drops from the drying hearth on the second, and from there on the first hearth, it effects a good mixing of the not uniformly heated ore. The auxiliary fire is useful for silver ores, which seldom contain so much sulphur as to burn long enough without the help of a nearer fire than that from the lower hearth. In working concentrated sulphurets, the upper fire can be dispensed with. The arch in the middle is only eight inches thick, but, being made level, the thickness increases toward the sides. A few days after starting up, the whole roof is sufficiently heated to keep the entire mass of the sulphurets red hot throughout, and the fuel is better utilized; one ton always being drawn from the upper hearth, when the preceding charge is finished. The charge on the lower hearth requires, generally, from eight to ten hours before the roasting is completed. In constructing a double furnace, in two stores, it is essential to use a number of iron ties across the width of the furnace between the lower and upper hearth; otherwise, on account of the weight of the upper charged hearth, the side wall would invariably give way in the course of a while. If used for the roasting of gold sulphurets, or such ores as do not require the auxiliary fire, the working doors can be placed at *m* and *n*, and, at *m*, a hoe can be advantageously used in drawing the charge to the lower hearth.

DOUBLE EDITION.—Next week we shall issue a double edition of the MINING AND SCIENTIFIC PRESS, giving a review of the mining industry of the Pacific Coast for the past year. The number will be of interest and value for reference, containing, as it will, statistics of the various branches of mining.

It is becoming more evident every day that the silver men are masters of the situation. It is not probable that Congress will materially interfere with the present law.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eos.

Montana Mines.

Granite Mountain Reduction Works.

[By Our Traveling Correspondent, R. G. Huston.]

The Granite Mountain mine is located four miles southeast of Phillipsburg, Deer Lodge county, and is, without exception or exaggeration, one of the finest in the Union. The fact that between April 8th and August 1st, 1885, they paid \$260,000 in dividends, is proof enough that I am not saying too much. They are situated about equidistant from Anaconda, on the Utah Northern and Drummond on the North Pacific, and get all their supplies from Drummond, as the road is much the best that way.

Their mill now consists of 30 stamps, one of the Howell improved cylinders, and the usual number of pans and settlers for operating that number of stamps. The mill is built on the mountain side below the mouth of the main tunnel, so they are enabled to do their work systematically and with very little expense in transferring from one department to the other by chutes, making the handling comparatively inexpensive.

At a conservative estimate, they have near ten million dollars worth of ore in sight, and are still following the lead in with magnificent prospects in the breast of the tunnel. This tunnel has been run for 850 feet on continuous pay in ore of a very high grade. Four men are now taking out ore enough to produce over \$100,000 per month, which proves that I do not overestimate the value of this property. This is tunnel No. 5; and No. 4, No. 3 and No. 2 are all open and in paying ore. The extra cost of a few dollars freight on the amount of salt used by this company would not be thought of or felt as it is by the lower grade of ores around Butte. This company supply their works with salt from Michigan via the Northern Pacific at the same rate the Butte people have to pay for a very inferior article from Salt Lake.

The size of the lead varies from one foot to 13 feet and they are working through a series of 5 tunnels, these running into the mountain on the lead at distances of from 200 feet to 300 feet apart, which have developed the mines enough for the present, as they now have ore enough in sight to run their present milling capacity for a long time. They are using an air compressor which runs 5 Burleigh drills. They have a steam hoist on one shaft. This is put in to lessen the expense of getting the ore from tunnel No. 5, which is some 200 feet below the mill, and in which they find some of their best ore. An average assay from the face of tunnel No. 5, on Nov. 27th, showed an assay value of 437 oz. silver.

Twenty samples sent to the New Orleans Exposition showed an average assay value of 227.8 oz. per ton. The highest assay was 5773 oz., and the lowest 296. They are now by running their 30 stamps working 30 tons daily, and are producing from 120 to 130 bars of bullion per month of a weight ranging from 1300 oz. to 1450 oz. each. This bullion carries about 25 per cent copper, the balance being fine silver leaving from 120,000 oz. to 130,000 oz. of fine silver per month; a very pleasant mining stock to have a supply of.

This mine is owned and operated by a St. Louis Co., Lewis M. Ramsay, President and August B. Ewing, Vice-President, Paul A. Fusz, Treasurer, John T. Fields, Secretary. They are ably represented in Montana by Capt. John W. Plummer, superintendent and manager, who having had years of experience is fully alive to the interests of the company at all times. Messrs. Hand & Coit are assayers for the company and are thoroughly up in their business as well as being very affable gentlemen for a newspaper man to come in contact with.

The Granite Mountain mine is a good example of how near a man in mining may come to a good mine and yet miss it. There had been prospecting done on it for several years, and nothing of consequence struck, and finally the company concluded at one of their meetings to shut down work, and telegraphed to stop it. At the same time the manager here was telegraphing them that he had struck the lead, and thus apparently the two telegrams passed each other on the way. As you see, however, the mine was not shut down, but had the company meeting been a day or two sooner, the development of the Granite Mountain would have been indefinitely postponed, a calamity that would have been a severe blow to this portion of Montana. The company are at present, on the mill and mine, giving employment to about 125 men, and many others gain their living from it indirectly. They are thus disbursing a large sum of money each month, which goes into general circulation.

Phillipsburg is the main point of supplies. It is a town of several hundred inhabitants. The Kaiser House is the principal hotel. There are several very good general stores, the usual amount of saloons, blacksmith shops, livery stables, etc. Flint creek valley, close by, is devoted to hay ranches; and further down, vegetables of all kinds are raised in abundance. It is also a good stock country. Horses and cattle running out on the range, though it is mid-winter, are in good condition.

There are a great many men at work in differ-

ent directions from this camp, prospecting, all living in hopes that they may fortunately strike on another Granite Mountain, Hops or Cable mine, and I truly wish they may, as their perseverance deserves to be rewarded.

The Miners' Side of the Debris Question.

The Miners' Association Memorial to the Secretary of War.

The following is a copy of the memorial addressed by the Miners' Association of California to the Hon. Secretary of War in response to the anti-debris document, which was presented to our board of supervisors in November last and subsequently signed by a majority of the board in their individual capacity:

OFFICE MINERS' ASSOCIATION,
320 Sansome Street, Room 23,
SAN FRANCISCO, Dec. 29, 1885.

To the Hon. William C. Endicott, Secretary of War, U. S., Washington, D. C.—DEAR SIR: Your memorialists, the Miners' Association of California, representing nearly 100 hydraulic mining claims, held by patent from the Government of the United States, and upon which they have expended in improvements incident to the prosecution of this class of mining the sum of (approximately) as found by United States Circuit Judge Sawyer) \$100,000,000, respectfully desire to enter their protest against certain statements contained in a memorial addressed to you and indorsed by the board of trustees of Sacramento city on October 25th, and subsequently by a number of the individuals composing the board of supervisors of San Francisco, but not officially, on November 17th.

Your memorialists, as citizens of the United States, and as representatives of the mining industry, are now, ever have been and are still desirous that the general Government should take measures to protect the navigability of our rivers by the judicious expenditure of such sums as have heretofore been appropriated for that purpose, but have been withheld by your predecessor on false representations, and which are now reproduced in the document hereinabove referred to, it being a duplicate of the preamble and resolutions emanating from the "Anti-Debris Association of Marysville." Neither of these documents contains any suggestion whatever with reference to a proper expenditure of the appropriation of \$250,000 already made and withheld during the term of office of Hon. Robert Lincoln.

The whole tenor of the document is an appeal for the interferences of federal departments in matters now in abeyance in the federal and State courts, based on statements some of which are totally erroneous and others matters of controversy.

While your memorialists admit that the navigable condition of the Sacramento river during the low-water season is in a deplorable condition, we deny that hydraulic mining is, as alleged, the prime factor, and submit that the condition of the river is in large degree due to natural causes, and to the incidents following this settlement and cultivation of the country on its water-shed, combined with the loosening of vast amounts of earth in the search for gold at an early period of our history. This material, which was enormously in excess of all deposits since, was deposited in the mountain streams long before hydraulic mining was known, and has gradually worked its way down to the main rivers, mingling enroute with the detritus from all classes of mining—hydraulic, drift and quartz crushings—as well as from agricultural and other causes. The two latter classes of mining have in the aggregate and are now supplying as much, if not more, material than the hydraulic mines, and any action by the federal departments tending to hamper or obstruct the business of hydraulic mining will of necessity apply to all classes of mining.

In this connection we respectfully submit that had the Congressional appropriation of \$250,000 been expended on the rivers by your predecessor, under the supervision of the proper Government engineers, there would not have been cause of complaint, and we reassert that the obstruction to the expenditure was by the direct act of the authors of the memorial hereinbefore referred to—the Anti-Debris Association of Marysville.

While we recognize that it is the province of your department to take cognizance of the condition of the bays and harbors, the navy yards, arsenals, forts and other Government property, as well as navigable rivers, we respectfully suggest that authentic and reliable data on these subjects can be obtained only from the records of the War Department, and through its resident officers and engineers. The boards of supervisors of the different counties can have no personal or official knowledge of the subject matter of the memorial.

Your memorialists further represent that the statements of this memorial in respect to the quantity of land covered by mining debris, its value, and the amount of gravel put in the streams, are widely at variance with the facts, and are not sustained by any official report emanating from a Government or State engineer, or by any judicial finding, either federal or State. To controvert those statements in detail would be a loss of time. They rest merely on the *ipse dixit* of unscientific and irresponsible bodies, so far as the issues involved are concerned.

We repudiate with indignation the charge that "a considerable number of the hydraulic mining corporations, and also individual owners of mines, continue to run great quantities

of debris into the rivers, in defiance of law." And we assert that no mines are being run without the knowledge and sanction of the federal and State courts which have assumed jurisdiction, and in their wisdom have judiciously decreed that such mines may be worked lawfully when the property of others is not injured.

Your memorialists further represent that the average producing capacity of the gold mines of California is at least \$20,000,000 per annum, but that by reason of litigation arising between farmers and miners and the insecurity to mining property resulting therefrom, the gold product has been decreased to thirteen and a half millions, and is in danger of falling to ten millions or less per annum in the near future. This has been attended with much business depression, and suffering, pending the legal adjustment of the rights of the parties litigant; but the whole matter has now resolved itself into a few problems of law and engineering, which can be settled without the intervention of your Department, other than in the performance of its functions as a protector of Government property.

We further represent that the gold-bearing period of life in our State, based on an average production of twenty millions per annum, cannot be predicted with any degree of certainty, but from data compiled from official and scientific sources we feel confident in placing the minimum term at 100 years, and even then our mines will not be exhausted.

We assert, without fear of contradiction by good engineering authority, that a very large percentage of the auriferous gravel to be washed may be retained in the mountain streams by proper dams, so it will never reach the navigable rivers in a quantity to tax their carrying capacity in the least, when such rivers are improved. Many such dams have already been constructed and maintained, some of them with the knowledge and sanction of the United States Circuit court; and both the federal and State courts have uniformly decided that on a proper showing of the restraint of any mining debris complained of, they would modify or dissolve the injunctions heretofore issued. The burden of the constructions of such dams would fall on the miners, who are willing, to the extent of their ability, to assume it, on the assurance of non-intervention from sources other than the courts.

Your memorialists, however, beg to call your attention to the fact that it is unjust to the present mining interest to impose upon it, if it was able to sustain it, the entire expense now of such restraining structures as your engineers might deem necessary, in improving the navigable rivers, which improvements must commence in the tributaries, now laden and filled with detritus from all sources since gold was first discovered. That the miners are not only desirous, but willing to aid the Government in such work, is evident from the offer that was made to your predecessor, to give to the Government the sum of \$125,000 provided the Government would devote a like sum out of the \$250,000 appropriated to the construction of a single restraining dam in the Yuba river, to prevent material now there from coming down into the lower river. This application of a part of the appropriation was defeated by those who are still opposed to any expenditure (until gold gravel mining in California has entirely ceased), and who have prepared and forwarded to you the memorial referred to.

The miners, as a class, are not such outlaws as said memorial classes them, and beg to assure you of their sincere regard for our courts and the law as well as the belief that the evils complained of from mining debris can be easily cured with out destroying the mining industry; but this can only be done properly by the general Government, in which work the miners will join heartily. And they ask that, instead of further oppressing them and their industry, as requested by the anti-mining memorial hereinbefore referred to, the general Government shall come to their relief in such manner as its engineers may deem most feasible. Respectfully submitted,

THE MINERS' ASSOCIATION.

L. L. ROBINSON, President.

W. A. SKIDMORE, Secretary.

Academy of Sciences.

The annual meeting of the California Academy of Sciences was held on Monday, January 4th, Professor George Davidson presiding. The names of J. W. Anderson, Charles H. Clark and George A. Johnson were proposed for membership. L. H. Foote, ex-Minister to Corea, Professor Edward S. Holden, President of the University of California, and E. S. Clarke were elected members of the Academy. E. L. Greene was elected a life member for valuable services rendered to the Academy.

The Recording Secretary, C. G. Yale, presented his annual report, which showed that 22 members had been added to the roll during the last year—15 resident members, 6 life members and one honorary member. There are now in the society 141 life members and 172 resident members, making a total of 313.

Treasurer Brooks' report showed that the total receipts for the year were \$10,101.44, and the disbursements \$8840.74, leaving a cash balance in favor of the society of \$1260.70.

The report of the Librarian, Carlos Troyer, went into details regarding the cataloguing and indexing of the books belonging to the Acad-

emy, which is being done by Captain Churchill. There have been three bulletins published by the society, and Bulletin 4 will be published during the present year. The society is now making exchanges with 220 societies of science and learning in different parts of the world. The report stated that the proceedings and memoirs of the society should be published in order to facilitate correspondence with other societies of sciences.

E. L. Greene, Curator of Botany, reported that the herbarium of the society was in a magnificent condition. During the year just ended the following donations and contributions were made: One hundred species from Dakota, 200 from Oregon, 320 from Arizona and Sonora, 100 from Eastern California, 50 from Northern California, 40 from Colorado, 1200 from Europe and Africa, 500 from Australia, and other small contributions, making a total of 3055 species. Many of these were rare specimens, and some of them unknown to science before. Mr. Curran is engaged in the task of poisoning the specimens in the herbarium, to prevent destruction from bugs and pests.

W. G. Harford, Director of the Museum, reported that many contributions had been made to the museum during the year.

Mr. Keep, Curator of Conchology, presented his report, the tenor of which was that 500 specimens of shells had been donated during 1885. He is engaged in assorting, marking and numbering the collection, about 2100 boxes being completed.

The report of the Board of Trustees gave the history of different business transactions during the year, and presented a financial summary similar to the statement made by the Treasurer. The report stated that the Trustees had been compelled to borrow \$5000 on a promissory note from the Lick Trustees, but this was for an occasion of urgent necessity, although the greatest economy had been practiced. The Board hoped that this act would not be taken as a precedent, and that its successors would follow the rigid rule which had always been the policy of the Trustees, to borrow no money unless there was sufficient security on hand to balance the indebtedness.

President Davidson, in accordance with the custom of retiring officers, presented a paper on the general condition of the association during the past year. The paper discussed the reports of the different officers, and argued that their contents justified the assertion that the Academy was enjoying a season of substantial prosperity, and that the scientific progress was all that could be desired. Prof. Davidson then reviewed the history of the Academy since its inception, and singled out each landmark in the progress of the society, from the visit of Agassiz in 1870 to the Lick bequest in 1878. The paper pictured a bright outlook for the Academy. It referred to the generous donations of Charles Crocker, Leland Stanford and James Lick, and with donations from other sources, the Academy has now before it a prospect equal to that of similar organizations abroad, which have long stood in the front rank of investigators of science. The report alluded to a legacy which is yet in store for the Academy, and has been reduced to writing, but from whom was not stated. President Davidson paid a high tribute to the devoted labors of Dr. Kellogg, who is the only surviving one of the founders of the institution.

The librarian reported that the council at its last meeting resolved that the library of the Academy should be for reference only, and that no books should be loaned outside.

The judges and inspectors of this election, which was held during the day, reported the election of the following officers and trustees: President, George Davidson; 1st Vice-President, Justin P. Moore; 2d Vice-President, J. T. Evans; Corresponding Secretary, S. B. Christy; Recording Secretary, Charles G. Yale; Treasurer, Elisha Brooks; Librarian, Carlos Troyer; Director of the Museum, W. G. W. Harford. Trustees—George E. Gray, Thomas P. Madden, Charles F. Crocker, Ralph C. Harrison, Lewis Garstle, Robert W. Simpson, James M. McDonald.

Professor Davidson remarked that an event would take place on the night of the 9th inst., which he had for many years longed to witness, namely, the occultation of a star by the planet Saturn. He hopes to be able to satisfy himself whether the star can be seen through the dividing rings and the dusky rings. The star (*Mu Geminorum*) that will be occultated is so small or so distant—eleventh magnitude—as to require a telescope of considerable power to see it. The phenomenon will begin at a quarter before 7 o'clock P. M. and end at 10:30 P. M.

Judge Freer of Oroville has granted a new trial in the case of McElroy vs. Collins et al., holding that under the Deadwood town-site decision by the Supreme Court of the United States the mineral reservation in railroad patents does not affect a mineral not known to exist at the time of the issuance of such patent, all mineral discovered after the issuance of the patent passing to the patentee.

The Herald says: The business which the mines of Southern California, Arizona and New Mexico bring to Los Angeles is becoming immense. It is safe to say that 25 carloads of goods, wares, merchandise and produce are daily sent to these mines by the merchants of this city.

News from the Cassiar gold fields says the hill diggings struck on Deass creek give \$14 to a pan of dirt.

MECHANICAL PROGRESS.

One Result of the Multiplication of Special Machines.

It must be evident to the observer that the increasing use of special costly tools for rapidly doing much of the work formerly done through ordinary machine shop processes has not worked so much injury to small shops where such tools cannot be afforded, as was predicted. More and more every year the work done by such machines is turned out in the way of articles of regular manufacture, and sold in many instances cheaper than they could be made in the small shops even with the special tools, in use only part of the time. There is no occasion in the small shops for machinery for making taps, reamers and such small tools; they can be bought from the manufacturer for less money than they could be made. Gear wheels are carried in stock by manufacturers, and the same is true of other standard parts of machines. Most shops, large or small, buy finished nuts, studs, bolts and set screws in preference to making them. The establishment of standard sizes and shapes has been a blessing in this respect to the small machine shop; as further standards are agreed upon, the finished parts of machines and machinery that will be furnished from manufacturing entirely devoted to their manufacture will be still further increased, to the manifest advantage of the small machine shops. There is compensation in everything; the tendency to special manufacture created by the use of these costly special machines leaves the prospects of the machinist who starts in a small way in about as satisfactory a condition for achieving success as ever. Those things which he cannot afford to arrange for making cheaply, he is likely to find offered to him readily made at prices lower than they are likely to be produced by anyone, except he makes a business of making them.—*American Machinist*.

CASTING AND COOLING HEAVY CASTINGS AT KRUPP'S.—Mr. Geo. Richards, superintendent of the motive power of the Boston and Providence Railroad, was lately in Europe, and was one of the very few visitors who have succeeded in gaining admission to the famous Krupp steel works at Essen. He saw a ten-ton crucible steel casting being poured, and an enormous 70-ton steel casting being very gradually cooled, the outside being warmed with coke fires until the inside had partly solidified, when the block was to be hammered into shape to form the main piece of an immense gun. The enormous array of furnaces in which the crucibles are heated, and the perfect manner in which a large number of men (in some cases 500) all lift their 80-pound crucibles out of the furnaces, and pour them into the mold in rapid succession, is described as being a wonderful sight. The scrupulous care bestowed upon the minutest detail was a noticeable feature about their manipulation of steel. If, after extended trials, a certain practice or proportion of ingredients had been found to give the best results, that practice was absolutely and exactly adhered to, and the common phrase, "Oh, that's near enough!" appeared to have no place in the vocabulary at Krupp's works.

THE GIMLET-POINTED SCREW.—Not many years ago gimlet-pointed screws, such as we have to day, were unknown. The screws of those days were finished off flat at the end, and a hole had to be bored for each screw, so as to permit it to enter the wood. Some of the best inventions the world has known were by lazy fellows; and the gimlet-screw was one of them. A mechanic who was "born tired," and who hated the labor of boring a hole in the wood for each screw, conceived the thought that if the screw were furnished with a little tail end in the shape of a pointed gimlet, much trouble might be saved. At first the manufacture of such screws was attended with difficulties, but machinery to overcome these was in due time invented, and the gimlet-pointed screw is now one of the necessities of the present age.

EXPORT OF LOCOMOTIVES.—The United States is now sending abroad about \$3,000,000 worth of locomotives per annum, the total value of those exported in the last fiscal year being \$2,819,946. This, at an average of \$10,000 each, represented about 290 engines. In the fiscal year ended June 30, 1882, the number of engines shipped did not exceed 133, the estimated value being \$1,455,717. Of the 282 locomotives exported from the United States in 1883-84, 65 went to the Argentine Republic, 49 to the United States of Columbia and Panama, 34 to Mexico, 32 to Brazil, 27 to the Dominion of Canada, 19 to Chili, 14 to Australia, 13 to Central America, 14 to Cuba, 6 to Spain, 3 to San Domingo, 3 to Sweden, 2 to Venezuela and 1 to England.

MACHINE WORK VS. HAND WORK.—An illustration of the advantage of machine over hand work is shown by the fact that quite recently a New York firm sold in Pittsburg, against local Pittsburg competition, some boilers made of steel rolled in Pittsburg, sold through a Boston commission house to a Connecticut manufacturer, and built by these, by machinery. The Connecticut firm has bending rolls which will take in 18" wide; they make the heads by machinery, and do the whole thing by machinery as far as possible.

HOW IS THE BRITISH IRON TRADE TO BE HELD?—An English correspondent of the *American Manufacturer*, under the above head, writes as follows: "This undoubtedly is an inquiry which is forcing itself upon the iron and steel master upon this side, as he is brought face to face with the disagreeable facts which are exercising his mind as he stands in the midst of mills but partially running. He is urged by those who would be his monitors, to bear in mind that 'it is important that we should recognize the fact that the iron trade of Great Britain has had a growth that is remarkable, and it is unlikely that that rapidity of growth can be continued.' 'This little country (it is added) produces not much short of half the pig iron produced in the world. It cannot be expected that that should continue, because other nations will try to produce the iron they need.' In eed (it is continued) 'our foreign trade in some kinds of iron is being trenced upon; we send out much more pig iron than we used to do, but we do not increase the exports of all other kinds of iron as rapidly as we have those of crude iron.' The British iron master has it pressed upon him that he has 'no longer the monopoly of the iron trade of the world,' and moreover, that he 'is never likely to recover the monopoly.' The same correspondent in speaking of the capabilities of the United States for producing heavy steel forgings, says: 'Sheffield, especially, is not pleased with the official report which lays it down that the United States steel masters are qualified to produce all the forgings for guns, and all the plates for armor-clads or forts that the government may need, the more so, as the information as to the report is accompanied with intelligence which seems to point to the United States (government being about to) act upon recommendations of the report. Recent heavy investments in steel plant at Sheffield are threatened in a yet more serious degree, by what our own Government are doing at Woolwich. There the authorities have for some time past been making all their own steel forgings up to 15 tons weight each; and their success is making them anxious to go on to heavier weights. It was largely in expectation of good government orders that the heavy outlays in plant for such work were undertaken in Sheffield."

THE USE AND ABUSE OF TOOLS.—It is proverbial that a manufacturer or an interested man cannot be induced to make correct statements in regard to the performance of a tool or machine. If accurate information is necessary, the proper place to seek it will be found in the repair shop. Those who have the work of keeping a tool in order can sometimes be induced to tell the truth. When in search of information, the scrap heap or the second-hand dealers' shops will frequently prove mines of knowledge. They should always be carefully worked when it is possible to do so. The careful designer studies his worn-out machine with quite as much care as the operator of the new ones. Wear searches out weaknesses which no amount of forethought or circulation would discover.

WIRE BELTS FOR STONE CUTTING.—The principle of continuous motion, as used in the belt saw for wood, which has recently been applied to stone, seems to be fast coming into quite general use. This device, instead of a flat metal band, as in the saw, consists of three steel wires twisted together and run at a very high speed which form the cutting face. Water and sand are applied in the manner usual with the ordinary flat saws for stone. According to *Engineering*, from which we take the above, it is claimed that such saws advance in marble at from 10 to 24 inches per hour, depending upon the hardness of the stone. It is also used for quarrying purposes in dividing up masses of stone which project between recesses in the quarry.

FOR TESTING STRUCTURAL MATERIAL.—Representative Campbell, of Pennsylvania, will introduce a bill of the House Committee on Manufactures, of the Forty-Eighth Congress, to provide for a commission to test structural materials. This bill was once within five of passage, and only failed on account of the absence of some of its most active supporters. As there are many new members in the House, the work will have to be gone over. The friends of the measure might therefore as well put themselves in communication with their Representatives in Congress, so as to insure action at the present session. The measure is a very important one, and should be heartily endorsed and supported by the public generally.

NEARLY ALL SMOKE MAY BE CONSUMED WITHOUT SPECIAL APPARATUS, by attending with a little common sense to a few simple rules. Suppose we have a battery of boilers and "soft coal" is the fuel. Go to the first boiler, shut the damper nearly up, and fire up one-half of the furnace, close the door, open damper and go to the next boiler and repeat the thing. By this method, nearly if not quite all the smoke will be consumed.

STILL LARGER.—Krupp & Co. are now manufacturing four cannons, still larger than any they have yet turned out, and larger than any in the world. Each gun will weigh 120 tons, and will require a charge of 600 pounds of powder, with a projectile weighing one ton. These guns are for the Italian Government, which already owns the most formidable iron clads in the world.

SCIENTIFIC PROGRESS.

NEW KIND OF BRICK.—Messrs. Bleining and Hasselman, two German chemists, have, it is said, recently patented a method for obtaining products that will be more resisting to humidity, etc., than ordinary bricks and tiles. After drying and grinding the clay they make a mixture as follows:

	Parts.
Clay.....	914
Iron filings.....	3
Table salt.....	2
Potash.....	1
Elder or willow wood ashes.....	2

The whole is heated to a temperature varying from 3362 degrees F. to 3632 degrees F. At the end of from four to five hours the argillaceous mixture is run in' o molds, then rebaked in the ovens—always protected from the air—at a temperature of 842 degrees F. to 932 degrees F. The product may be variously colored by adding to the above 100 parts; two parts of manganese for a violet brown, one part of manganese for a violet, one part of copper ashes for a green, one part arseniate of cobalt for a blue, two parts of antimony for yellow, and one and a half parts of arsenic and one part oxide of tin for white. These products resist the action of acids, and are well adapted for sewers, etc.

TELEGRAPHING FROM MOVING TRAINS.—The Phelps' induction system of telegraphing from moving trains will, undoubtedly, prove to become a very valuable invention, and a new and important factor in securing greater safety in railroad traveling. The cost of applying the system is very small, not exceeding \$50 to \$100 per mile, according to the character of the wire used, and the manner of putting it down. The cheapest, and generally a perfectly practical way of adjusting the wires is to support them by insulators upon the ties, about three inches outside and just below the surface of the rail. The coil upon the car which is to take up signals from the line, will be just outside of the wheels. A more expensive way is to place the wire in a wooden box for more perfect protection from accident or breakage, or other interference. Cost, \$150 per mile. The induction can be almost as readily taken up from a wire thus protected, as from a naked wire. The invention has fairly passed from its experimental stage, and is now in process of practical trial. But the introduction of so important an innovation upon existing methods of operating trains, cannot be accomplished hastily, and it will probably take time to bring about its general adoption, even after its entire success has been fully and practically demonstrated.

SAPONIFICATION BY ELECTRICITY.—In 1882, Professor Rotondi presented to the Academy of Sciences in Turin a communication in which he recommended for commercial purposes the use of electricity for the decomposition of concentrated salt solution into caustic soda and chlorine gas. The experiments were confirmed by MM. Rudin and Bidet, and recently Professor Rotondi has renewed and completed his researches, which appear to be of eminently practical importance. With a dynamo machine and diaphragms, the saponification process is easily effected by means of sodium chloride (ordinary salt) and fat. The separation of this resultant products, glycerine, soap, and chlorine gas, offers no difficulty. No caustic soda or potash is thus required for saponification, and the process would be particularly applicable in cases where the chlorine could be at once used for bleaching textile fiber, and where sufficient water power is at disposal. In such works, bleaching and saponification operations might be carried on at night while the motive power is not otherwise required. Professor Rotondi is further engaged in very interesting experiments on the extraction of metals directly from the ores by means of electricity.

MAGNETIZATION OF WIRE.—It has long been known that thin rods of iron and steel, when subjected to external magnetism by means of an electric current circulation in a hollow coil surrounding the rod, are elongated, and the elongation has been very accurately measured. Mr. Shellford Bidwell has, however, found, from recent experiments, that if the magnetization be carried to a certain point the wire no longer lengthens, but begins to shorten again, and retract beyond its original length. This curious discovery has not yet been satisfactorily explained. Nickel rods or wire are known to retract under the same kind of magnetization; but, so far as Mr. Bidwell's experiments went, this contraction did not change into elongation.

ELECTRO-PLATED WOOD. the discovery of which has been recently noted, is coming into use for many purposes, among which are, handles of all kinds, including umbrellas, canes, carving knives, etc. The silver is thrown upon the wood by a process which has proved extremely difficult in practice. The deposit of silver, of course, follows all the peculiarities of the wood, and the ordinary handle is simply garished in most ineradicable silver. The special advantage is in the variety of designs that may be produced.

REFINING TANNIC ACID.—Refining of tannic acid is said to be a newly-established business in this country. A German writer affirms that the whole process consists in mixing tannic acid

with a certain percentage of gum substitute, sieving well and selling. Good tannic acid is quite soluble in methylated spirits of wine, or leaves only a very small residue; gum substitute is not soluble in spirits, it can also be readily detected by this microscope. Some tannic acid contains matter insoluble in spirit, which is not gum substitute; it appears to be the woody part of the galls from which the tannic acid is prepared.

A NEW ATTACHMENT TO THE MICROSCOPE has been devised, the object of which is to observe the melting points of minerals, while under the process of examination. The device is called a "Meldometer," from the Greek word *meltein*, to melt. It consists of an adjunct to the mineralogical microscope, whereby the melting-points of minerals may be compared or approximately determined and their behavior watched at high temperatures, either alone or in the presence of reagents. It consists of a narrow ribbon of platinum, 2 mm. wide, arranged to traverse the field of the microscope. The ribbon, clamped so as to be readily renewable, passes bridgewise over a little scooped out hollow in a disk of ebony. The clamps also take wires from a battery, and an adjustable resistance being placed in circuit, the strip can be thus raised in temperature up to the melting point of platinum. The disk being placed on the stage of the microscope, the platinum strip is brought into the field of a one-inch objective, protected by a glass slip from the radiant heat. The observer is sheltered from the intense light at high temperatures by a wedge of tinted glass, which further can be used in photometrically estimating the temperature by using it to obtain extinction of the field.

COPPER IN THE COLORING OF A BIRD'S FEATHERS.—There is a bird at the Cape of Good Hope noted for its beauty of plumage, especially the rich red upon its wings. This red coloring matter has been analyzed and found to contain nearly six per cent of copper. This mineral must be collected in infinitesimal quantities and eaten with the food. When these birds are kept in confinement and not suffered to have any access to copper they entirely lose the tint which is due to that mineral. Traces of copper have been found in other animals, especially in oysters which are collected near to the mouths of streams which flow from the vicinity of copper mines. In this connection it may be mentioned that the presence of zinc in plants has been repeatedly observed, not only in such as grow near deposits of zinc ore, but also, though in minute quantities, in plants which grow on soil in which not a trace of zinc can be detected.

SULPHUR IN COAL.—M. Duenfleit has been inquiring why there is so much sulphur in stone-coal, and why there is so little of free alkaline carbonates in the ashes. For this purpose he has analyzed the surviving species of the families of the coal plants, particularly the *Equisetaceae*, and has found in them a greater than the usual proportion of sulphuric acid. Hence he deduces, as the answer to his questions, that the coal plants were more highly charged with sulphur than most existing plants, and that for that reason their alkaline constituents assumed the forms of sulphates instead of carbonates.

THE COLORING MATTER OF ROCK SALT.—It is a noticeable thing about natural rock salt crystals, that if they have a bluish or pinkish hue, and be dissolved in water, all the color disappears in the artificial crystals afterward formed by evaporation. Probably the coloring matter is of an organic nature, and is separated by recrystallization. The coloring matter of the quartz crystals known as amethyst, is supposed by geological chemists to be of organic origin. In a collection of minerals, numbering several hundred specimens, many chemical curiosities besides those mentioned are, of course, included.

INDIAN AND EGYPTIAN REMAINS.—Double bitted axes are found in the Indian mounds all over this country. They are made with a groove around the center for lashing onto the handle, with a hole for inserting the helve and with a socket for the same purpose. The double bitted form was used also by the Scythians and Egyptians, and seems to have been the oldest form of this useful tool.

SCIENTIFIC agriculture is making decided progress in this country, and becomes more important every year. Several of the States, among them Ohio, Indiana, Virginia, Georgia, Connecticut, Louisiana, North and South Carolina, Mississippi, Tennessee, have official agricultural chemists, who control or inspect fertilizing compounds, besides making valuable experiments.

MAGIC LANTERN TO GIVE RELIEF IMAGES.—Mr. Crowther employs two converging lanterns and stereoscopic views, but one lantern emits only green rays and the other only red. The spectators are supplied with eye-glasses having one red and one green lens. A slight displacement of the optical axes of the lanterns makes the figures advance or recede.

THE MICROSCOPE describes a pretty experiment. Upon a slip of glass put a drop of liquid auric chloride or argentic nitrate, with half a grain of metallic zinc in the auric chloride and copper in the silver. A growth of exquisite gold and silver ferns will form before the eye.



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SAN FRANCISCO:

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Passing Events.

The discussion in Washington over the silver question is closely watched by the miners on this coast, and, so far as can be seen at present, the silver men have the best of it.

The discovery of gold-bearing veins in San Bernardino county is another proof that our auriferous region is not thoroughly prospected, and that there is still plenty of room in the gold fields for men to hunt up mines.

The prosecution of deeper work on the Comstock is an event of note of interest to mining men. The hunt for bonanzas at great depth was given up some time since, but now they seem hopeful that riches will be discovered there, and the question is to be again tested.

The mining product of the year shows progress in most directions, the statistics giving evidence that the mining industry is profitable and in good condition.

THE Tucson *Star's* annual review of Arizona gives the following summary: Population, 65,000; head of live stock, 500,000; grain product 74,600,000 pounds; gold dust and bullion, \$282,614; silver bullion, \$2,671,400; ore shipments, \$1,831,500; copper produced, 24,360,000 pounds.

Sulphurets and Sulphuric Acid.

It will be of interest to manufacturers of sulphuric acid, and owners of mines producing sulphurets, to know that Prof. G. Lunge, of Zurich, the great authority on the manufacture of sulphuric acid and soda, has made some valuable calculations, based on statistical data, to show for what purposes and in what quantities sulphuric acid is made in England. These computations are of interest, as they bear directly on the prosperity of the great Spanish pyrites mines and traces the causes which have no mean influence upon that important supply of copper, the metal extracted from pyrites cinder. The following table contains the principal data:

Sulphuric Acid Produced in Great Britain.

YEARS.	Tons.	Tons.	Tons.	Tons.	Tons.
1878.....	447,900	417,406	330,494	124,271	872,171
1879.....	716,625	445,265	271,360	116,884	883,509
1880.....	771,771	501,612	270,159	133,653	905,424
1881.....	730,797	475,724	261,073	115,591	852,306
1882.....	806,703	472,151	334,612	134,742	941,535
1883.....	815,574	484,252	331,322	125,064	940,633

From these tables it is seen that the principal quantity of sulphuric acid is consumed in the manufacture of soda. The ammonia-soda processes, which avoid the use of sulphuric acid, have been looked upon as seriously threatening the pyrites mines by diverting from them their most important customer. It is not now denied that the new processes can produce soda cheaper than the old Leblanc process, but the latter has apparently obtained a new lease of life through the increased value of the hydrochloric acid, formerly a waste by-product, and the substitution of the one method of manufacturing soda by the other is not likely to progress with that rapidity which was not long since claimed for it. The other principal consumer of pyrites acid taking almost all the heavy quantities under "pyrites acid for other purposes," in the above tables, is the great fertilizer industry, whose requirements are subject to wide fluctuations. It strongly illustrates the interdependence of modern industrial and mining industries, that an important source of supply of copper should fluctuate through the intermediacy of two other industries, with the requirements of the farmers of Great Britain and other countries for fertilizers.

Mining Decision.

The Supreme Court of the United States has affirmed the decision of the lower court in the cases of James Joremy and James W. Kennedy vs. James W. Campbell and Elizabeth Dudley, on appeal from the Supreme Court of Utah. The action was commenced in one of the district courts of Utah to determine the rights of the parties to certain mining ground in that Territory. The court, in giving its decision, says: "The question is whether the location of a vein or lode, as running in one direction, but not marked on the surface for years and not developed, will be allowed to cover a claim made by others on ground different from that thus indicated and developed by years of labor and large expenditures, without objection from the complaining parties, because subsequent explorations by the first claimants disclose the fact that their vein runs in a different direction than they supposed and covers the claim of the other parties. We do not think that the original claimants can take the second claim."

In the case of a placer mining application, where judgment of possession had been rendered by a court in favor of the applicant, but the Land Commissioner on further hearing refusing to issue a patent, an appeal was taken to the Secretary of the Interior, in behalf of the applicant, on the ground that after the presentation of the judgment roll the Land Commissioner had no further power or authority, except the ministerial acts of preparing and issuing a patent, the Secretary of the Interior has decided that the judgment roll proves the right of possession only, and the applicant must still make the proof required by the law to entitle him to a patent, and the sufficiency of the proof is a matter for the determination of the Land Department.

The Silver King Mine.

The Silver King is one of Arizona's "show" mines, and has been for some years. The product of hollion has been good, and some of its ore has been marvellously rich. The affairs of the company have moved along quietly the past year—1885—the production of silver, reduced to a gold basis, being \$743,200.44, from which eight dividends, of \$25,000 each, have been paid the stockholders, aggregating in gold \$200,000, still leaving a good strong balance on hand in the treasury, with no indebtedness to provide for. It has been another dry year, and the water supply therefore lessened from natural causes, to remedy which two wells were sunk three miles from Pinal, and the water from them piped to the reduction works, this additional supply being sufficient for all present requirements. The treating of the heavy quartz ore by amalgamation has continued profitable by the new mill No. 2. Mill No. 1 continues, as heretofore, concentrating the porphyry ore at a profit. The work in the mine has been the extraction of ore from the 700, 600 and 500-foot levels, and in keeping all the underground workings, including the shaft, in good condition.

At the annual meeting this week, the superintendent reported that during the past year they extracted 27,160 tons of ore, which have been melted. A peculiarity mentioned in this mine is, that as the sorting of ore in the mine can provide but a portion of the waste rock required to fill vacant ground with, and as it became evident that the filling up of all worked-out ground should progress as closely following extraction as possible, it became necessary to establish a quarry on the surface to supply the deficiency in waste material. The point selected was the north side of the hill in which was sunk the old open ore pit, within 200 feet of the shaft. Since this quarry was opened, just a year ago, 8350 cubic yards of rock have been broken down, and out of this material 17,757 cars have been lowered to the mine levels.

There has been much done in the way of improvement during the year at the reduction works at Pinal. Having been instructed to proceed with the construction and provision of the increased facilities that were under consideration a year ago, the superintendent, Mr. Arthur Macy, removed the tanks and appurtenances of the old lixiviating plant from the south end of the mill buildings, and began the construction of a ten-stamp mill with four five-foot amalgamating pans and two eight-foot settlers, with adjunct crusher-house, containing a "grizzly" and an eight-inch by ten-inch Blake crusher, erected over a dry floor 12 feet by 20 feet, the screened and crushed ore dropping at once to the dry floor, which was placed on a level with the battery feeders. The mill is designed for treating the hardy-quartzose ore unfit for concentration by the method of dry crushing, roast chlorinating and amalgamation. As an auxiliary to the former method of lixiviation three large rotary roasting furnaces, 70 inches diameter by 16 feet long inside the lining, were erected in the mill, and these furnaces are now made use of again in connection with the present method of treatment, as is also a 12-inch by 24-inch Meyer cut-off engine. A bucket elevator and cage hoist are used to handle the battery and roasted pulp. An additional steel boiler 54 inches by 16 feet was obtained to furnish power, and recently another steel boiler of the same dimensions was set in position, replacing the old original boiler. The old lixiviating tanks, 15 in number, were moved to the highest point on the mill premises, set up compactly on framing, two tiers high, and a building 25 feet by 50 feet erected over them. They are now used as receiving tanks for water supply, carrying a ready reserve of 25,000 gallons.

The total amount of ore treated at Mill No. 1 during the year was 21,853 4 100 tons, which has yielded 68 shipments of concentrations, averaging about 11½ tons each, and aggregating 770.3525 tons. The ore shipped was about 3 52-100 per cent of that crushed. The average assay value of the ore, as per daily assays, was \$56.79, and that of the tailings similarly obtained, was \$6.75. Of the silver contents of the concentrations, 48 17-100 per cent was in the form of native silver, 51 83-100 per cent being combined in the various argentiferous sulphides.

With such material as required roasting, the average amount of salt used was 2½ per cent,

and the average chlorination 50 86 100 per cent, the silver being partially in native form. The consumption of quicksilver was 1.69 pounds per ton of ore treated, and the product was 22 bars of hollion of 852 68-100 average fineness.

In August the mill No. 2 was started. Since this mill started 1849 tons of ore have been crushed, of an average assay value of \$67.60, while the average tailings assay was \$9.35. Since the 1st of September, at which time the roaster stack was changed, the average assay value of the tailings has been \$6.72. For the past two months the roaster charges have been running on regular six-hour roasts, with two per cent of salt and an average chlorination of 49.15 per cent. The average of the chlorinations since the mill started was 49.25 per cent. The ratio of native to combined silver is somewhat the same as with the concentrating ore. This product has been 56 large bars of hollion of an average fineness of 703.28.

A little less than a year ago Mr. F. H. Blake, foreman of Mill No. 1, in the entire absence of any available water supply for the further treatment of the tailings from Mill No. 1, experimented upon a device for automatically concentrating them as they flowed directly from the mill. His device was put practically into operation and has been treating the tailings most of the year, with the result of an accumulation of about 1580 tons, having an average assay value of \$31.35 per ton, or a total assay value of \$49,533.

The report of the secretary, Joseph Nash, makes the following showing:

Receipts.	
Balance on hand January 1st.....	\$ 33,008.87
Sales of bullion during year.....	92,550.53
Sales of concentrations during year.....	650,649.91
	\$770,209.31
Disbursements.	
Assaying.....	\$ 564.00
Expenses.....	9,056.45
Insurance.....	1,657.75
Freight.....	19,439.14
Merchandise, machinery and supplies.....	37,374.28
Dividends No. 46 to 53 inclusive.....	200,000.00
Superintendent's drafts, account of mill and expenses.....	402,608.95
Balance on hand December 31st.....	106,140.74
	\$776,209.31

Adulterated Paints.

The Master Painters' Association, of this city, made a very sensible move when they resolved to appoint experts to investigate adulterated materials which are being passed off as genuine articles by irresponsible and dishonest workmen. This step was deemed necessary by the association in order to protect architects and property owners. It was further resolved that neither owners, architects nor contractors be charged for such expert services. A resolution was also passed not to employ any journeyman painter who worked for a master painter known to use "slumgullion" or "dope" stock, thereby abusing the confidence of architects and owners.

Everyone who has had any experience in this matter knows that it is difficult to have first-class material used, even when he pays for it. Of course, if people will cut painters down to very low prices for work, they cannot expect to get the best material; but the property owner can seldom tell for some months whether good lead and linseed oil has been used, or potash, fish oil and whiting. The "dope" or "slumgullion", as the painters call it, goes on easily, does not cost much, and looks well enough for a short time. But to have a good job which will last, of course the material must be good.

When an association formed in any one of the trades seeks to remedy abuses in its own line, it really does a good work, and the Master Painters' Association deserves credit for its resolutions. The President of the society also reminded the members that every one was expected to fulfill his contracts. If he did not, the association was pledged to fulfill them and expel the delinquent member. This was the principle of the association, and he hoped everyone present would live up to it so that the name "painter" might be a title of honor and not one of disgrace. The masters issue the following card to every journeyman in good standing:

To any Master House Painter on the Pacific Coast: This is to certify that—has been in my employ— (Signed) —, Master House Painter.

This is a passport to men traveling, and helps them to employment in the best firms, wherever they may travel.

Mountain Railroad Building.

The most famous of the Alpine railroads is the Gotthard, in Switzerland. It was the most difficult one to locate and construct, and is the most interesting one. It has many unique features necessitated by the climatical and elementary condition of the country traversed. A short time since Mr. Geo. J. Specht, vice-president of the Technical Society of the Pacific Coast, read a paper before the society on location and construction of the railroads across the Alps, in which he described many interesting details. Among them are the circular tunnels or loops, on the Northern Mountain division of the St. Gotthard.

Some distance below Erstfeld the railroad ascends along the right side of the valley to Am-

tunnel, is 4840' long, and forms a compound curve of 6° 15' and 3° 30', grade 121' per mile. The tunnel is built for double track. Its construction took two years and nine months.

This tunnel and 2150' of the continued line, with a grade of 137' per mile, have raised the road 167', being now nearly 200' above the bottom of the valley. The road then ascends with a grade of 132' per mile, between the stage road and the steep mountain sides toward the station Wasen, where a second artificial development is necessary. At the village Wasen, the railroad is again near the bottom of the valley, and encounters the second cataract. The railroad crosses the river Reuss, passes through the Wattinger tunnel (second circular tunnel, 3560' long), turning in the same to the right, recrosses the Reuss, runs along the same slope

with a grade of 316' to 528' per mile. The length necessary to overcome this steep section and the one immediately below, was obtained by an artificial development (Fig. 2), necessitating two long circular tunnels, five shorter tunnels, and three bridges across the Ticino. At the end of this development the railroad is 305' lower than at the beginning. The circular tunnel of Freggio, 5130' long, passes through gneiss, rich in quartz, while the rock through which the circular tunnel of Prato, 5102' long, passes, is gneiss micaceous slate. The grade in both tunnels is 121' per mile, and the curves are 5° 50'. They were worked by percussion drills and top-header (65 to 100 square feet) from the lower mouth upward, and by hand labor from the upper entrance. The monthly progress made in the benders varied between 145'

SENATOR STANFORD has introduced a bill granting the State of California five per cent of the net proceeds of the sales of public lands in the State to aid in the support of public schools; also granting California the right to select other lands in lieu of such sixteenth and thirty-sixth sections of public lands, as may be found to be mineral lands, and also providing that in all cases of entries of land under the desert land laws which may be suspended or cancelled the persons entering the lands, upon the relinquishment of their title, shall be entitled to receive back all money paid by them.

CONGRESSMAN McKENNA of this State has introduced a bill to encourage in California the manufacture of material for modern ordnance.

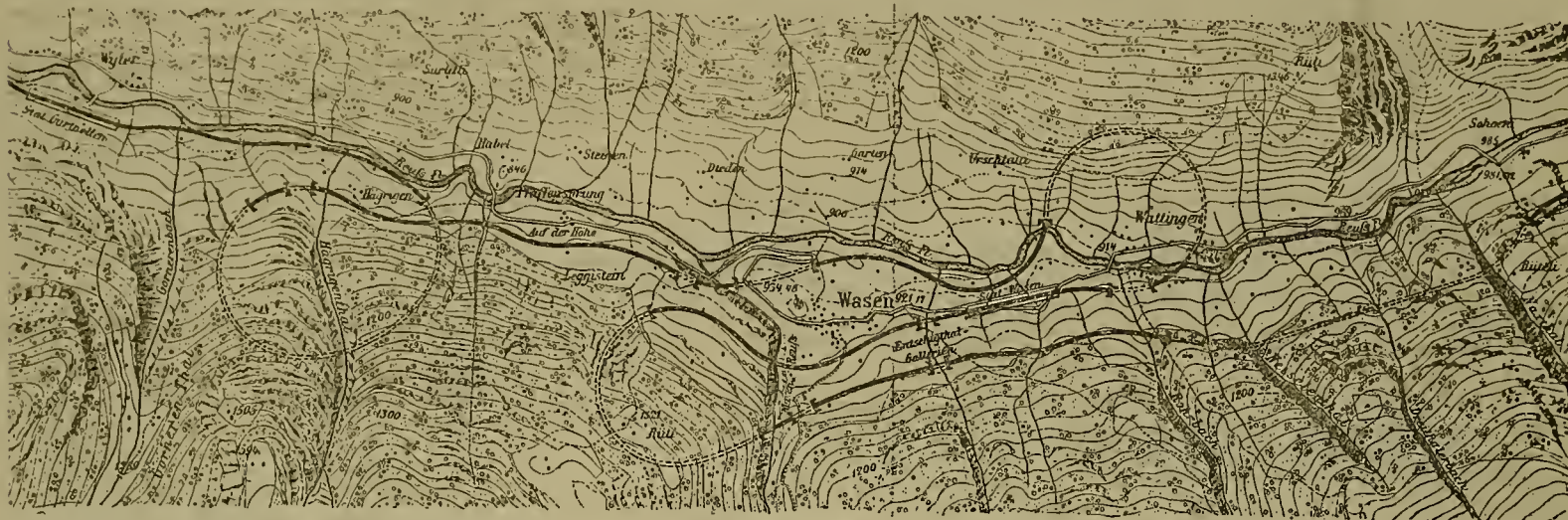


Fig. 1.—THREE CIRCULAR TUNNELS AT WASEN, ON THE GOTTHARD RAILROAD.

steg, passes through a tunnel 593' long, and immediately after over the Kerstelenbach on an iron viaduct. The grade of the road is 137' per mile. Then the line passes under the channels of several very powerful avalanches in two tunnels of an aggregate length of 2014'. The river Reuss is then crossed on an iron bridge. Now the road runs along the left side of the valley,

it ran along before, but in the reversed direction, until it enters the third circular tunnel (the Leggistein tunnel, 3590' long), in which it turns to the left, running again along the same mountain slope on which the lower two lines ran. The lowest and highest part of the line approach each other horizontally about 500', while their vertical difference is 410'. For a

and 230' by machine drilling, and from 65' to 99' by hand drilling. Below the last circular tunnel the road recrosses the Ticino on an iron bridge when the station Faido is reached 885' above the bottom of the valley and 2345' above sea level.

From Faido to Lavorgo the railroad runs near the stage road on the left side of the valley.

The bill creates a board of two army and navy officers and one civilian, whose duties shall be to erect two gun factories, one in California, either at Mare Island or Benicia at a cost not to exceed \$1,000,000 for each foundry.

THE Bodie Free Press says: The Aurora boom will result in the utilization of many



1:25,000.

Fig. 2.—LONG CIRCULAR TUNNELS NEAR DAZIOGRANDE.

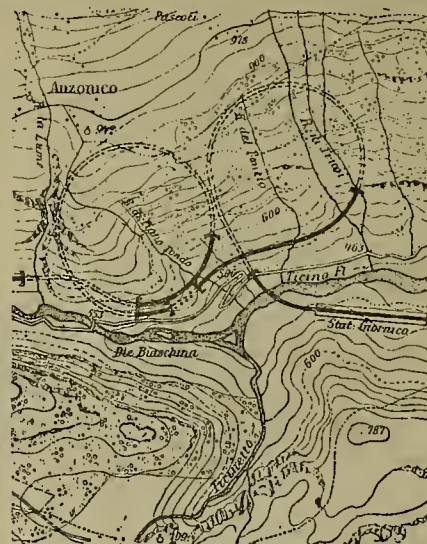


Fig. 3.—UNDERGROUND LOOPS IN THE BIASCHINA.

passing over several small bridges, tunnels, a viaduct of three spans, a 98.7' span, with two piers of masonry 85.4' high, and another viaduct of masonry with six arches each 33' span. The station Gurtellen is reached next; its elevation above the sea level is 2430'. The line is now near the bottom of the valley; about a mile beyond the station is the first cataract of the Reuss, the Pfaffensprung gorge; the grade of the valley is too steep to be available for a railroad. The difference of elevation between the lower entrance of the Pfaffensprung tunnel and the north portal of the Gotthard tunnel is 1084'; the length of the valley between these points is 27,000', which gives an average grade of 260' per mile. The railroad between these points is 48,200' long, or 26,200 longer than the valley. This length is gained by an artificial development, including three circular tunnels. (Fig. 1.) The first of them, the Pfaffensprung

distance of about 1.6 miles, three lines run nearly parallel to each other in different elevations. Both of the circular tunnels have a grade of 116' per mile and curves of 5° 50'. They were built by hand labor, top header, from 65 to 96.19 square feet large. The main Reuss is crossed twice on iron bridges. The Mayen-Reuss is crossed three times on iron bridges. At the end of this development the railroad is 426' above the bottom of the valley. The dangers threatened by numerous avalanches along this part of the Reuss valley are avoided by building the railroad underground.

Having passed the great St. Gotthard tunnel (which we have not space to describe here) the road passes several stations on the southern mountain divisions to Tiesso, which is at an elevation of 3080'. Then the first cataract of the Ticino valley, the gorge of Dazio, is encountered; the same is very wild; the river falls

between Lavorgo and Giornico the last cataract, the Biaschina, has to be overcome. The grade of the river is 610' per mile. An artificial development (Fig. 3) is again necessary, 2.35 miles long, including two circular tunnels, which are very near each other horizontally. The Piano-Tondo tunnel is 4945' long, and the Travi tunnel 5070' long. The grade in both tunnels is 121' per mile, and the curves are of 5° 50'. The rock encountered is solid gneiss, rich in quartz and feldspar. The top-headers were driven by percussion drills from the lower entrances; average cross-section of header 54 to 65 square feet; monthly progress in each header varied from 164' to 197'. The advance headers from the upper entrance were driven partly by hand labor, partly by machine drilling. Like all other circular tunnels, these were also built for double track, and are lined with masonry for nearly their entire length. This section belongs to one of the most difficult of Gotthard railroads.

thousands of dollars worth of valuable, yet dead stock now in Bodie. Mining interests work curious freaks. In 1878 it was the reverse. The only difference is that the Aurora revival will get the advantage of modern machinery from Bodie, while we got only primitive rackets from there.

It is reported that a San Francisco company will immediately erect on the Gila, about three miles from the Bates, Watson & Co.'s gold mines, Pinal county, Arizona Territory, a 10-stamp gold mill. This will add another to Pinal county's bullion producers, for the properties in question are good in grade and great in quality.

QUICKSILVER is steady at the recent advance. Coal continues in free supply and easy, though the cold weather of the past fortnight has increased the demand for house coals,

PRACTICAL HYDRAULICS.

NUMBER 13. COPYRIGHTED.

PRINCIPLES OF HYDRAULICS.

Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

With the value of $\frac{c_f l}{r}$ is usually omitted as insignificant; or, more direct, let equation (120) be transposed with respect to v , and $\frac{1}{r}$ be substituted for $\frac{p}{a}$.

$$v = \left(\frac{2 g r \times h_f}{c_f l} \right)^{\frac{1}{2}} \quad (129)$$

Substituting $s = \frac{h_f}{l}$, the sine of slope, CED, in (129),

$$v = \left(\frac{2 g}{c_f} \right)^{\frac{1}{2}} \left(r s \right)^{\frac{1}{2}} \quad (130)$$

Hydraulicians have given different empirical formulas for the determination of the values of c_f . Thus: Weisbach, assuming that the resistance of friction increases simultaneously as the square, and as the square root of the cube of the velocity finds as follows:

$$z = (4 c_f) = 0.01439 + \frac{0.017155}{v} \quad (131)$$

This formula, as claimed by its author, agrees more accurately with observations than do those of the older hydraulicians. In the experiments from which it was derived, the velocity varied from 0.14 feet to 15.25 feet per second, and the pipes from 1.06 inches to 31 inches in diameter.

H. Darcy's formula for velocity, resolved with respect to this coefficient, gives:

$$c_f = .00497554 + \frac{0.0010433}{v} \quad (132)$$

This formula was deduced from very extensive experiments. In these the variation, with respect to velocity, was from 0.29 feet to 16.24 feet per second, and with respect to diameters of pipes, from 3 inches to 20 inches nearly.

Weisbach remarks of this formula, that it "is not sufficiently accurate for small velocities."

J. T. Fanning's "Series of Coefficients of Flow (m)" $m = c_f$ "of water in clean pipes, under pressure, at different velocities, and in pipes of different diameters"—from which the following table is extracted—can be made more simple and comprehensive on this subject than can well be rendered in a single formula. These coefficients are deduced from experiments, in which the variation in velocities was from 0.18 feet to 46.7 feet per second, and in which the diameters of the pipes were from $\frac{1}{2}$ inch to 3 feet.

TABLE 16.

Coefficients of resistance to the Flow (γ) of Water in Clean Pipes. Extracts from Fanning.

Velocity, feet per second.	DIAMETERS.							
	1-inch Coef.	1-inch Coef.	3-inch Coef.	6-inch Coef.	12-inch Coef.	24-inch Coef.	48-inch Coef.	96-inch Coef.
.1	.0150	.0119	.0080	.0073	.0067	.....	.....	.....
.2	.0143	.0116	.0079	.0072	.0066	.0055	.....	.....
.3	.0137	.0113	.0078	.0072	.0066	.0055	.....	.....
.4	.0133	.0110	.0078	.0071	.0065	.0054	.....	.....
.5	.0128	.0107	.0077	.0071	.0065	.0054	.0040	.....
.6	.0124	.0104	.0077	.0070	.0064	.0054	.0040	.0029
.7	.0120	.0102	.0076	.0070	.0064	.0053	.0040	.0029
.8	.0116	.0100	.0075	.0069	.0063	.0053	.0040	.0029
.9	.0113	.0097	.0075	.0069	.0063	.0053	.0040	.0029
1.0	.0110	.0095	.0074	.0068	.0062	.0053	.0040	.0029
1.1	.0107	.0093	.0074	.0068	.0062	.0052	.0039	.0029
1.2	.0104	.0091	.0073	.0067	.0062	.0052	.0039	.0029
1.3	.0101	.0090	.0073	.0067	.0061	.0052	.0039	.0029
1.4	.0099	.0088	.0072	.0067	.0061	.0051	.0039	.0028
1.5	.0096	.0087	.0072	.0066	.0061	.0051	.0039	.0028
1.6	.0094	.0085	.0072	.0066	.0060	.0051	.0039	.0028
1.7	.0092	.0084	.0071	.0066	.0060	.0051	.0039	.0028
1.8	.0090	.0083	.0071	.0065	.0060	.0051	.0039	.0028
1.9	.0088	.0082	.0070	.0065	.0060	.0050	.0039	.0028
2.0	.0086	.0081	.0070	.0065	.0059	.0050	.0038	.0028
2.25	.0084	.0079	.0069	.0064	.0059	.0050	.0038	.0028
2.5	.0080	.0077	.0068	.0063	.0058	.0049	.0038	.0028
2.75	.0078	.0075	.0068	.0063	.0058	.0049	.0038	.0028
3.0	.0075	.0073	.0067	.0062	.0057	.0048	.0038	.0028
3.5	.0073	.0071	.0066	.0061	.0056	.0047	.0037	.0028
4.0	.0072	.0070	.0065	.0061	.0055	.0047	.0037	.0027
4.5	.0070	.0068	.0064	.0059	.0054	.0047	.0037	.0027
5.0	.0069	.0067	.0062	.0057	.0053	.0046	.0036	.0027
6.0	.0068	.0066	.0061	.0057	.0053	.0045	.0036	.0027
8.0	.0066	.0065	.0060	.0056	.0052	.0045	.0036	.0026
9.0	.0065	.0064	.0059	.0056	.0051	.0045	.0036	.0026
10.0	.0064	.0063	.0058	.0055	.0051	.0044	.0035	.0026
12.0	.0063	.0061	.0058	.0054	.0050	.0044	.0035	.0026
14.0	.0062	.0061	.0057	.0053	.0049	.0043	.0035	.0026
16.0	.0062	.0060	.0057	.0053	.0049	.0043	.....	.....
18.0	.0062	.0060	.0057	.0053	.....	.....	.....	.....
20.0	.0062	.0060	.0057	.....	.....	.....	.....	.....

COMPARISON OF THE VALUES OF THE COEFFICIENT OF RESISTANCES, c_f , AS FOUND BY WEISBACH, DARCY AND FANNING.

Ex. 62.—The velocity, in a clean pipe $\frac{1}{4}$ foot di-

ameter, being 1 foot, what is the coefficient of resistances?

Cal. 1st.—By Weisbach's formula (131), square root of given velocity:

$$\sqrt{v} = 1.$$

Substituting the value of \sqrt{v} in (131), $z = 4 c_f = 0.01439 + \frac{0.017155}{1}$; whence,

$$c_f = .0079. — Ans.$$

Cal. 2d.—By Darcy's formula (132), hydraulic mean radius, $r = \frac{d}{4} = \frac{1}{4}$.

Substituting value of r in (132), $c_f = .0066. — Ans.$

Cal. 3.—By Table 16, from Fanning's series of coefficients, $c_f = .0074. — Ans.$

Ex. 63.—The velocity in a clean pipe 2 feet diameter, being 4 feet per second, what is the coefficient of resistance?

Cal. 1st.—By Weisbach, formula (131), square root of given velocity:

$$\sqrt{v} = \sqrt{4} = 2.$$

Substituting value of \sqrt{v} in (131), $z = 4 c_f = 0.01439 + \frac{0.017155}{2}$; whence,

$$c_f = .0057. — Ans.$$

Cal. 2d.—By Darcy's formula (132), hydraulic mean radius, $r = \frac{d}{4} = \frac{2}{4} = \frac{1}{2}$.

Substituting value of r in (132),

$$c_f = .0052. — Ans.$$

Cal. 3d.—By Table 16, Fanning's:

$$c_f = .0047. — Ans.$$

Ex. 64.—The velocity in a clean pipe 4 feet diameter, being 9 feet per second, what is the coefficient of resistance?

Cal. 1st.—By Weisbach's formula (131), square root of velocity,

$$\sqrt{v} = \sqrt{9} = 3.$$

Substituting value of \sqrt{v} in (131), $z = 4 c_f = 0.01439 + \frac{0.017155}{3}$; whence,

$$c_f = .0050. — Ans.$$

Cal. 2d.—By Darcy's formula (132), hydraulic mean radius, $r = \frac{d}{4} = \frac{4}{4} = 1$.

Substituting value of r in (132),

$$c_f = .0051. — Ans.$$

Cal. 3d.—By Table 16,

$$c_f = .0037. — Ans.$$

Ex. 65.—The velocity in a clean pipe 8 feet diameter, being 9 feet per second, what is the coefficient of resistance?

Cal. 1st.—By Weisbach's formula (131), square root of velocity,

$$\sqrt{v} = \sqrt{9} = 3.$$

Substituting value of \sqrt{v} in (131), $z = 4 c_f = 0.01439 + \frac{0.017155}{3}$; whence,

$$c_f = .0050. — Ans.$$

Cal. 2d.—By Darcy's formula (132), hydraulic mean radius, $r = \frac{d}{4} = \frac{8}{4} = 2$.

Substituting value of r in (132),

$$c_f = .0050. — Ans.$$

Cal. 3d.—By Table 16, from Fanning's series of coefficients,

$$c_f = .0026. — Ans.$$

Weisbach states that his formula for the coefficient of resistance (z) "is founded upon the assumption that the resistance of friction increases at the same time with the square and with the square root of the cube of the velocity." He further says "that the values from newer experiments show that the coefficient of resistance (z) for the friction of water in tubes decreases not only as the velocity (v) increases, but also, although more slowly, as the diameter of the pipe becomes greater." He omits, however, to amend his formula so as to embrace this element.

The coefficient of resistance (c_f in our notation) as deduced from Darcy's formula for velocity, decreases as the diameter of the pipe increases.

An inspection of the results obtained by Darcy's formula for Examples 64 and 65 would show that this diminution practically ceases, when the diameter exceeds 4 feet. Thus, for a pipe 4 feet diameter, the coefficient found is .0051, and for a pipe 8 feet diameter, it is .0050. The results for large pipes, by Darcy's formula, are not in conformity with those obtained by later experiments.

By Table 16, from Fanning's series, the coefficients under the imposed conditions, as seen, are .0037 for a 4-foot pipe, and .0026 for an 8-foot pipe.

It is to be noticed that, in general, the results of later experiments with respect to the velocity of water in large pipes closely approximate those tabulated by Mr. Fanning in terms of the coefficient of resistance. Thus F. P. Stearns, M. Am. Soc., C. E., in a paper read before the American Society of Civil Engineers, October 1, 1884, states that three experiments made with the "Sudbury Conduit," a cast iron pipe 4 feet

diameter and 1747 in length, coated with a coal tar preparation, and in good condition, resulted as follows:

Mean velocity, 4.966 feet.
Mean coefficient of velocity, 142.11 feet.
Mean value of ri , 0.001221 feet.

Substituting the values of the mean velocity here given, $v = 4.966$ feet, and the value of $ri = rs = 0.001221$, in equation (130) and resolving with respect to the coefficient of resistance,

$$c_f = 0.003188.$$

Referring to Table 16, we find the coefficient of resistance corresponding to a velocity of 5 feet (nearest approximate to 4.966 feet) in a pipe 4 feet diameter,

$$c_f = 0.0037.$$

Substituting the value of $c_f = 0.0037$ in Eq. (130), and resolving with respect to the coefficient of velocity, c , as employed by Mr. Stearns, there results: $c = 131.9$, as compared with 142.11.

Mr. Stearns further states, in the paper referred to, as follows:

"The experiments of Hamilton Smith, Jr., M. Am. Soc., C. E. (transactions for April, 1883), give curves of coefficients for pipes up to 30 inches diameter. Extending these curves would give for a 48-inch pipe, with velocity of 5 feet per second, a coefficient of 128, as compared with 142.1 above."

"The experiments of S. N. Tubbs, M. Am. Soc., C. E., on pipes of 2 and 3 feet diameter, would give by extending the curves a coefficient about the same as that in the average above."

"The experiments of Dr. Lampe, at Danzig, give results somewhat higher than those of Mr. Hamilton Smith, Jr."

The formulas applied to Example 3, to find the values of the coefficient of resistance for a 3-inch pipe, give by

Weisbach, $c_f = 0.0079$.
And by Darcy, $c_f = 0.0066$.
The value by Fanning is $c_f = 0.0074$.

We thus perceive concerning the values of this coefficient for small pipes, that Fanning differs less than 7 per cent from Weisbach, whose experiments were confined, as hitherto shown, to this class of pipes, while Darcy differs nearly 20 per cent from him. It must not be understood, however, that these differences obtain to the same extent in estimating the velocity. Reference to Eq. (130) shows that the coefficient of velocity depends not upon the direct value of the coefficient of resistance, but upon the square root of it. So that in estimating the velocity or quantity of flow, the real difference, in the case cited, between the results of Weisbach and Fanning would amount to only about $\frac{1}{3}$ per cent.

INTERPOLATION IN TABLE 16.

The general formula of Darcy furnishes a simple means of interpolation with respect to the coefficients of resistance, when the difference between the extremes is not large. Thus the general formula is:

$$c_f = m + \frac{n}{r}, \quad (133)$$

In which r represents the mean hydraulic radius m and n auxilliary numbers whose values are determined by substituting the tabulated values of r and c_f in (133) between which latter intermediate values are sought corresponding to different values of r' . The values thus found for m and n are employed as constants in the determination of these intermediate values of c_f .

For example, the velocity of flow being 3 feet per second, let it be required to determine the values of c_f due the diameters 30, 36, 42 and 44 inches, between 24 and 48 inches.

The hydraulic mean radii of 24 inches and 48 inches, are respectively $\frac{3}{4} = \frac{3}{4}$ and $\frac{4}{4} = 1$. By Table 16, the value of c_f due a pipe 24 inches diameter is .0048, and that due a pipe 48 inches diameter is .0038. Substituting these values of r and c_f in Eq. (133), there results:

$$m + 2n = .0048, \quad (134)$$

$$\text{and } m + n = .0038. \quad (135)$$

Subtracting (135) from (134),

$$n = .0010. \quad (136)$$

Substituting value of n of (136) in (134),

$$m = .0028. \quad (137)$$

The hydraulic mean radii corresponding to the given intermediate diameters, are respectively $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and $1\frac{1}{2}$.

Substituting the values of $m = .0028$, $n = .0010$, and $r = \frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and $1\frac{1}{2}$ in (133), there results for the given diameters:

$$30", c_f = .0028 + \frac{.0010}{\frac{5}{8}} (.0010) = .0044, \quad (138)$$

$$36", c_f = .0028 + \frac{.0010}{\frac{3}{4}} (.0010) = .0041, \quad (139)$$

$$42", c_f = .0028 + \frac{.0010}{\frac{7}{8}} (.0010) = .0039, \quad (160)$$

$$44", c_f = .0028 + \frac{.0010}{1\frac{1}{2}} (.0010) = .0039, \quad (141)$$

to be interpolated as required.

*This series of articles will shortly be published in book form by Dewey & Co., publishers of the MINING AND SCIENTIFIC PRESS, 252 Market St., S. F. Subscriptions for the book will be filled in the order in which they are received.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

COMBINED WARDROBE AND TRUNK.—C. Lempert, Jacksonville, Oregon. No. 333,238. Dated Dec. 29, 1885. This combined trunk and wardrobe consists in various details of construction by which the trunk is adapted to be readily converted into a wardrobe, and the wardrobe reconverted into a trunk as desired.

FARE BOX.—F. O. Landgrane and Milton E. Willis, S. F. No. 333,233. Dated Dec. 29, 1885. This is an improvement in fare-boxes such as are employed upon street cars, and it consists in a means for preventing the abstraction of money or fares after they have been placed in the box. This box is so arranged that no straps with adhesive substance can be used to abstract fares, nor can the money be removed by reversing the box.

STANDARD FOR MAPS AND CHARTS.—John S. Fox, Oakland, assignor of one-half to J. P. Garlick, No. 333,211. Dated Dec. 29, 1885. The device is intended for conveniently supporting and exhibiting maps, charts, or similar articles. It consists of a vertically-extensible standard, with a clamping device, an arm pivoted at the top, so that it may be made to stand either vertically or transversely, with a means for retaining it in position, and adjustable clamp-supports or hangers, by which the map or chart is suspended from the bar.

MEANS FOR THE PROPULSION OF VEHICLES OR CARS.—F. O. Landgrane, Marx P. Schetzel and M. E. Willis, S. F. No. 333,234. Dated Dec. 29, 1885. This consists of an endless traveling platform-belt, which is so constructed that a horse or other animal may travel upon said platform, and this is carried by the car or vehicle to be propelled, having a means of communicating power from it to the traction wheels, means for increasing or decreasing the power, according to the grade or road, and also a means for increasing or decreasing the angle at which the platform is supported, together with certain details of construction.

INCANDESCENT ELECTRIC LAMP.—August Harding, Oakland. No. 333,219. Dated Dec. 29, 1885. This is of that class of electric lamps in which a continuous carbon-conductor is heated in a vacuum to incandescence. In this there is a peculiar air-tight joint between the globe and base of the lamp. In lamps of this description it is usually the case that when the carbon-conductor is destroyed by use or accident the lamp is useless. Then, again, in order to exhaust, the lamp glass tubes in some cases are attached to the globe, and finally, a perfect vacuum is not obtainable by reason of the failure to expel all occluded gases. The object of Mr. Harding's invention is to overcome these difficulties by constructing a lamp, the globe of which can be readily separated from the base, and the carbon-conductor replaced without injury to any of the parts of the lamp, and further, by so making the lamp as to adapt it to become subject to the peculiar means employed to expel the occluded gases and to fit its parts together within an exhausted chamber, whereby it is itself thoroughly exhausted.

CODLIN MOTH TRAP AND TREE PROTECTOR.—George W. Thissell. Winters, Yolo county. No. 333,265. Dated, Dec. 29, 1885. The tree protector is so constructed as to encircle the tree, and is provided with apertures through which the insect in its larval state passes, and, when developed, cannot return. A perforated chamber surrounds the tree; and layers of fabric are wound around the trunk inside the chamber. There is also a seal of wax in the bottom and top of the chamber. Several patents have been granted to this inventor, and this one covers an improvement on the trap previously patented. The operation of the trap is as follows: The larva, seeking hiding places to escape from the ravages of birds and insects, enter through the perforation of the casing or chamber. They prefer to get as near the bark as possible and finding the folds of fabric around the trunk secrete themselves in it and spin their cocoons, in due course of time passing through the chrysalis state and developing into moths. As larvae they do not wish to leave the trap; but as moths they cannot escape because the holes through which they enter as larvae are too small to permit their egress as moths. They soon perish without laying eggs as they only lay them in the fruit. Cotton and old rags were formerly used around the tree inside the trap, but Mr. Thissell finds cotton is not good for this purpose, nor is the indiscriminate use of old rags; but he finds that the wrapping of the tree with the fabric such as gunny sacks are made of, is a much better inducement for them. The chamber is made now of a double conical shape, with holes all over the surface, entrapping those that come from above or below. The trap is placed at any point above the ground without touching it, as is usually done when cylinders of wire gauze are used. This gives a bottom for the trap and allows the larva to come in contact with the tree before reaching the trap, which they are more likely to enter after being on the tree. The wax seal prevents them getting out at these parts. This trap is more easily arranged and more effective than those previously patented by this inventor.

USEFUL INFORMATION.

TREATMENT OF OLD ZINC.—According to the *Revue Industrielle*, a new method has been introduced by M. Piallat for dealing with the clippings, shavings, turnings, and other forms of waste zinc resulting from various manufactures. The value of these forms of old zinc is very much lower than that of new zinc, because there is always an amount of solder present, which spoils the zinc for rolling and for most other direct uses. The difference in value is so considerable that M. Piallat considered the subject of treating this zinc debris to be well worth study and experiment. It is stated that he has fully succeeded in making a very profitable success of his labors. He places the zinc cuttings, etc., in a sort of basket, in which they can be subjected to heat and to centrifugal force at the same time. The actual basket-like container is surrounded by an outer envelope. Superheated steam or heated air can be used, and the temperature regulated as desired. Under the influence of the heat and the centrifugal action, the solder is melted, detached from the zinc, and driven to the exterior of the container, where it collects and is drawn off. The solder thus collected is remelted and cast into bars. It is stated that the value of it alone will pay all the costs of the operation. The zinc remaining after this operation is further purified by fusion. It is then very suitable for use in making small castings, and can be sold at lower prices than the brands of zinc that are now specially in use for this purpose. This branch of trade is stated to be of considerable importance, great quantities of zinc being used in Paris alone for casting figures and for clock-making. M. Piallat estimates that one of his machines, working ten hours a day, can extract the solder from three tons of old zinc. This amount of purified zinc will be too great to be all disposed of for casting purposes, and so the remainder is to be rendered pure and soft enough for rolling into sheets. It is stated that M. Piallat has also found a method of purification far superior to any in ordinary use, and producing a better quality of metal than any on the market; but this method is kept a secret at present.

PERCENTAGE.—The reckoning of percentages, like the minus sign in algebra, is a constant stumbling block to the novice. Even experienced newspaper writers often become muddled when they attempt to speak of it. The ascending scale is easy enough. Five added to 20 is a gain of 25 per cent; given any sum of figures the doubling of it is an advance 100 per cent. But this moment he change is a decreasing calculation the inexperienced mathematician betrays himself, and even the expert is apt to stumble or go astray. An advance from 20 to 25 is an increase of 25 per cent; but the reverse of this, that is, a decline from 25 to 20, is a decrease of only 20 per cent. There are many persons, otherwise intelligent, who cannot see why the reduction of 150 is not a decrease of 100 per cent, if an advance from 50 to 100 is an increase of 100 per cent. The other day an article which had been purchased for 10 cents a pound was resold at 30 cents—a profit of 200 per cent; thereupon, a writer in chronicling the sale said that at the beginning of the recent depression several invoices of the same class of goods, which had cost over 30 cents per pound, had been finally sold at ten cents per pound—a loss of over 100 per cent. Of course, there cannot be a decrease or loss of over 100 per cent, because that loss wipes out the whole of the investment. An advance from 10 to 30 is a gain of 200 per cent; but a decline from 30 to 10 is a loss of only 66 2/3 per cent. The *New York Sun*, says the journal from which we quote, prides itself on the exactness and purity of its style, and indulges in frequent criticisms of its contemporaries; but in its description of the recent great orchid sale, it affirms that "some of the higher-priced plants brought 150 per cent less than had been paid for them." Of course, if nothing was realized from them the loss would only be 100 per cent less than they cost.

METHOD OF DEADENING SOUNDS IN BUILDINGS.—General M. C. Meigs writes to the *Sanitary Engineer* as follows in reference to an article on deadening the sounds, which appeared in a late issue: "I have found it impossible to make myself heard by a person on the other side of a large window, double glazed, interval between panes seven-eighths of an inch. Glass is very elastic, and should, I suppose, therefore, be a good sound-conductor. But the voice cannot be heard through two sheets of ordinary French window-glass separated by seven-eighths of an inch of air. In this, I think, may be found a hint for shutting off sound."

ANCIENT LEAD PIPE.—The Romans appear to have been acquainted with the use of leaden pipe, although they had not the appliances for falsifying any of large dimensions, or sufficiently strong to withstand pressure from the fountain head. In the museum at Cherchel is a piece of lead piping made by rolling a sheet of metal, turning the edges over, and then running molten lead along the joints.

ELECTRIFIED PAPER.—A sheet of ordinary paper warmed in front of a fire, will in a dark place, give a very decided electric spark upon the application of the knuckle, with a crackling

sound. Place a sheet of gold leaf between two sheets of paper thus electrified, and pass a pencil point over them in a zigzag course, and a luminous flash, quite strong, will appear.

THE EFFECT OF AGE ON THE QUALITY OF CEMENT.—It is quite generally understood that hydraulic cements are more or less deteriorated by age, unless they are kept in an especially dry atmosphere. The *Manufacturer and Builder* refers to this matter as follows: It has been ascertained from practical experience with hydraulic cements (of which we may take Portland and Rosendale as typical examples) that they gradually deteriorate in setting and hardening qualities by age, even when kept in dry situations. The material gradually absorbs moisture (even from the driest atmosphere) and carbonic acid, and chemical changes take place in it analogous to those which take place when it is made into mortar for use. The longer the cement is kept the greater will be the extent of these changes and, consequently, the greater the extent of the deterioration. Ultimately a cement may become quite useless from these causes. As was lately pointed out in one of our contemporaries, however, a certain amount of air slaking is beneficial to certain qualities of Portland cement, as will appear from the following extract: "Portland cement, especially when underburnt, very frequently contains an excess of free caustic lime, which, when the cement is used immediately after its manufacture, causes it to swell very considerably, and sometimes destroys the masonry in which it is used. To avoid this very common danger, the English architects and engineers usually open at once the bags of Portland cement sent from the manufactory to the work, and empty the contents on the floor of a room, leaving them there exposed to the air, and perhaps turning them occasionally, for about a month before use. The dry cement, if fresh, swells under this treatment, from evaporation of the particles of caustic lime. When it has become so far air-slaked that a little of it, made into a stiff paste with water and put into a bottle, will not expand enough to burst the bottle, it is considered to be in proper condition for making mortar. If the air-slaking is carried beyond this point, the cement powder gradually loses its power of setting, and at last becomes as inert as so much fine sand."

HARNES BLACKING.—Somebody has found in an "old scrap book" the following receipt, which, it is said, will give a beautiful polish: Two ounces white wax and three ozs. of turpentine are to be dissolved together over a slow fire; then add one oz ivory-black and one drachm indigo, to be well pulverized and mixed together. When the wax and turpentine are dissolved, add the ivory black and the indigo, and stir till cold. Apply very thin and brush afterwards.

PREFERENCE IN COLORS.—Many kindergarten teachers agree that the first choice among colors of all children under seven years is yellow. This admits of few exceptions.

WEIGHT OF PATTERNS TO IRON USED.—In making patterns for iron castings, the iron in pounds is equal to the same weight of pine in ounces.

GOOD HEALTH.

Gaslight and Ventilation.

The subject of the ventilation of rooms in which common gas is ordinarily used, says *Popular Science*, is beginning to attract attention. It is stated upon scientific authority that a jet of common gas, equivalent to 12 sperm candles, consumes 5.45 cubic feet of oxygen per hour, producing 3.21 feet of carbonic acid gas, vitiating, according to Dr. Tidy's "Hand-book of Chemistry," 348.25 cubic feet of air. In every five cubic feet of pure air in a room there is one cubic foot of oxygen and four of nitrogen. Without oxygen human life, as well as light, would become extinct. It is asserted that one common gas jet consumes as much oxygen as five persons.

Carbonic acid gas is the element which in deep mines and vaults causes almost insensibility and suffocation to persons subjected to its influences, and instantly extinguishes the flame of any light lowered into it. The normal quantity of this gas contained in the air we breathe is .04; one per cent of it causes distress in breathing; two per cent is dangerous; four per cent extinguishes life, and four per cent of it is contained in air expelled from the lungs. According to Dr. Tidy's table, each ordinary jet of common gas contributes to the air of a room 16 by 10 feet on the sides, and nine feet high, containing 1440 cubic feet of air, 22 per cent of carbonic acid gas, which continued for 20 hours without ventilation, would reach the fatal four per cent.

In addition to the consumption of oxygen and production of carbonic acid by the use of common gas, the gas itself, owing to defectiveness of the burner, is projected into the air. Now, considering the deleterious nature of all illuminating gases, the reasons for perfect ventilation of rooms in which natural gas is used for heating and culinary purposes are self-evident, not alone as a protection against explosions, but for the health of the occupants of the house, remembering that a larger supply

of oxygen is said to be necessary for the perfect combustion of natural than of common gas.

Carbonic oxide, formed by the consumption of carbon, with an insufficient supply of air, is the fatal poison of the charcoal furnace, not infrequently resorted to, in close rooms, as a means of suicide. The less sufficient the air toward perfect combustion, the smaller the quantity of carbonic acid, and the greater the amount of carbonic oxide. That is to say, at the time of ignition the chief product of combustion is carbonic oxide, and, unless sufficient air be added to convert the oxide to carbonic acid, a decidedly dangerous product is given off into the room. Yet, by means of a flue to carry off the poisonous gases from burning jets, the combustion of gas, creating a current, is made an aid to ventilation. Unfortunately, this important fact, if commonly known, is not much heeded by heads of families or builders of houses.

WHITE OF EGG IN OBSTINATE DIARRHŒA.—From a German paper we learn that Celli has recently called attention to the curative properties of the albumen of hens' eggs in severe diarrhœal affections. In a discussion before a medical society at Rome he advocated its use, and related two cases of chronic enteritis and diarrhœa which, having resisted all treatment, speedily made complete recoveries under the use of egg albumen. The same diet is strongly recommended in the diarrhœa accompanying febrile cachexia, and in that of phthisis. In two cases of diarrhœa dependent upon tertiary syphilis, it was found of no avail. On post mortem examination diffuse amyloid degeneration of the arterioles of the villi was found in these cases. The whites of 8 or 10 eggs are beaten up and made into an emulsion with a pint of water. This is to be taken in divided quantities during the day. More may be given if desired. The insipid taste can be improved with lemon, sause or sugar. In case of colic, a few drops of tincture of opium may be added.

TREATMENT OF A FELON.—We give the following for what it is worth, from a correspondent of the *Michigan Farmer*: "I wish to tell those who may suffer from that terrible scourge, felons, of a painless remedy that will effect a perfect cure in 24 hours, as I have had occasion to prove within the last three days. A lady came here, who had been suffering over two weeks, with a felon on the end of her middle finger. I saturated a piece of wild turnip, the size of a bean, with spirits of turpentine and applied it to the affected part. It relieved the pain at once. In 12 hours there was a hole to the bone, and the felon was destroyed. I removed the turnip and applied healing salve, and the finger is well." If there is any virtue in the above, we presume any other convenient carrier for the turpentine will answer as well as wild turnip.

EFFECTS OF LIGHTNING ON THE HUMAN BODY.—A person struck by lightning does not know it—the fluid being much quicker than thought. The nerves which convey pain are rather slow in their power to convey information. Stick a pin in the tail of an elephant and quite a perceptible interval occurs before the noble animal gives his opinion of the man or boy at the end of the nervous system on trial. Lightning does its work before the victim knows anything. Two men were struck while taking refuge under a tree. Both were carried into the house and laid out for dead. One of the men revived, and after weeks of suffering and infirmity, has got out again and is still living. He said that he knew no more about having been struck by lightning than he was conscious of having lived before the flood. It was all news to him when told of the fact.

VACCINATION.—Here is an item to which the attention of Mr. Bergh and those who act with him in opposing vaccination is invited. It comes from Montreal, Canada, in the form of a telegram, dated December 26th: Yesterday, for the first time since smallpox became epidemic, there were no new cases of the disease reported. It is a remarkable fact that, although there have been over 300 persons employed by the health department as sanitary police, isolated police, hospital nurses, and in other capacities, not one of them contracted the disease. As a matter of course, they were all vaccinated.

HOW TO USE MILK AS FOOD.—Milk when swallowed rapidly by the glassful is very unwholesome. A quantity entering the stomach at once is changed from a fluid, by the acid juices of that organ, into a hard, cheesy curd, through which the gastric juices cannot pass; it is turned over and over, and as its surface only can be reached, it digests very slowly. It is sometimes fatal to a weak stomach. It should be taken slowly, eaten with something else, or sipped by the spoonful.

TO RELIEVE TOOTHACHE.—Dr. J. R. Irwin says that one of the best and most pleasant things that can be used to relieve toothache is chewing cinnamon bark. It destroys the sensibility of the nerves and suspends the pain immediately, if the bark is of good quality.

STOPPING HICCOUGH.—A Brazilian physician, Dr. Ramos (Gen. Therap), states that refrigeration of the lobe of the ear will stop hiccough, whatever its cause may be. Very slight refrigeration will answer, the application of cold water, or even saliva, being sufficient.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

WORK STARTED.—Amador Ledge, 9: Work was started on the Green Aden or New London claim, near Plymouth, last Monday. The fine hoisting machinery on the abandoned claim, near Enterprise, is to be removed to the recent purchase as speedily as possible. H. C. Farnham has also been awarded a contract for the supply of timbers and lumber. Everything indicates a vigorous development of the mine. Work at the San Joaquin, commonly known as the Tellurian, near Pine Grove, has been temporarily suspended until pumping machinery can be erected. The shaft has been put in good condition to the depth of 200 feet, to which depth it is drained by a tunnel. Beyond this work cannot proceed until facilities for controlling the water are provided. The pump is expected to be in running order inside of a month. The big tunnel at Middle Bar is now in a distance of 2800 feet; the header is advancing at the rate of about five feet per day, and is still in hard country rock, with small stringers of quartz occasionally met with. Nine hands are employed. The Mammoth mill, which has been running on half time for some months past, is again running day and night. The discovery of a fresh ore body in the upper tunnel has led to this gratifying change. The mine and mill give employment to 15 men. At the Moore everything continues to look favorable. An elevated track is being constructed for the purpose of running the ore to the mill, and the mill is otherwise being put in readiness for starting. There is a large quantity of ore on the dump ready for crushing, all apparently of good average grade and showing considerable free gold. Stations are being opened at the 300-foot level, and when this work is completed it is probable that the shaft will sink another hundred feet. From the dimensions of the ledge and the live character of the ore, it is the universal opinion that inside of a year the Moore will have a 40-stamp mill in successful operation, and be giving employment to 100 men. At the Kennedy the water-power hoisting works are receiving the finishing touches, and will no doubt get fairly started in a few days. It is thought that it will take until April to free the mine of water.

Calaveras.

MILL.—*Mr. Echo*, Jan. 9: The new mill now in course of construction on the Tozer mine, will be completed and ready for crushing ore in three or four weeks. A rich strike has been made in the Jackrabbit mine at Dogtown. Paving gravel has been struck in the Bully Bully mine in Dogtown. It is the intention of the owners of the Stickle mine to have their new twenty-stamper completed in a few weeks. Then look out for big results.

El Dorado.

SPRINGFIELD MINE.—*Placerville Observer*, Jan. 9: The new shaft on the Springfield mine, which is intended to intersect the ledge at a depth of 1500 feet, is now being rapidly sunk toward the 1200 foot level. The permanence and immense richness of the lode has long since been established. Other mines in that vicinity are being developed, which promise to equal the Springfield in stability, and prove that mining district to be the richest in the State. Esperanza mine, after having been shut down for a number of years, was started up last week. N. D. Burlingham some time since commenced work of re-opening, and by persistent, indefatigable labor, put the mine into such a state of development that enabled him to bond it to San Francisco capitalists. He has now taken a contract to sink 200 feet. The mine looks and prospects well, and promises large returns in the near future. A force of six men are at work in the Buckeye mine, Texas Hill, on shares, and are highly elated over the prospects for a fine cleanup. Mr. Stevens, owner of the mine, furnishes everything, including the working of the gravel, and divides equally with the men who do the work. The main tunnel at this mine is in over 600 feet, and has paid from the first. We have it from good authority that the Bright Hope mine, owned by H. W. Hulbert, editor of the Georgetown Gazette, and A. D. Gibbs, is in a fair way to develop into one of the best and most permanent mines in the county. Mr. Hulbert has devoted two-thirds of his time to working and developing the mine, while his good wife assisted in publishing the paper. Parties who are now negotiating for the purchase of this mine, we learn, made an offer of \$10,000. However this may be, there certainly is enough ore in sight to amply compensate Mr. Hulbert for his patience, toil and expense.

THE SLATE MOUNTAIN MINE.—*Placerville Observer*: In El Dorado county there is at the present time great mining activity, and especially is this true of the Georgetown divide, where quartz interests are brightening very materially, and many mines are being worked successfully. The one that is attracting the attention of mining men and the people generally is the Slate Mountain mine, owned by Benjamin & Zombro. This mine is located on Slate mountain, and is in a locality that was prospected to a considerable extent at one time; but as new discoveries were made in other districts, just so fast were the diggings deserted to a degree, and for a time but little work was done there. During the past year the locality has again come into prominence, and great interest is manifested in the development of the Slate Mountain mine, and the richness of the ore taken therefrom. The mine is running at full blast, employing in all about 20 men. They have just completed sinking a shaft, and are now running levels and stoping. At the 200-foot level the ore body is four feet wide, and is far richer than any previously taken out. In fact, the ore is of the specimen quality, many of which are now on exhibition at Georgetown. The adjoining mines on the south—the southern extensions—owned by the Grover brothers, are prospecting well, and as much is expected from these as has been derived from their neighbor.

Inyo.

THE POLETA.—*Register*, Jan. 9: Supt. George Storey has this week been putting additional men at work in the Poleta mine, which action means something encouraging.

MINE SOLD.—*Independent*, Jan. 9: The Chulula

mine, at Beveridge, has been sold to San Francisco parties, Mr. Preston was the buyer, Hario Arambula the seller.

Nevada.

AMONG THE MINES.—*Foothill Tidings*, Jan. 7: After a very careful search among the mine owners, that is those of them we could find, we give the following items as the result of our travels: The Gold Point mine, located southeast of the Idaho, has recently purchased the Halphen ground, joining the property, from Weissbein Bros. The shaft on the Gold Point has reached a depth of 130 feet, with a drift 250 feet north. In this drift there is a good ledge of gold bearing ore. The ledge averages two feet in thickness, encased in smooth walls, and can be easily worked. The company are now making preparations for putting up a 10-stamp mill early in the summer, and water power will be easily obtained for running purposes. The style of wheel to be used in the mill has not yet been decided upon. The Empire mill is kept running day and night upon ore from the 8, 10, 11 and 15 hundred foot levels. The rock is first-class for milling and the sulphurets are rich. The Empire has what is considered to be a model quartz mill, and the 20-stamps now running will soon be reinforced by 20 more. The carpenters and millwrights, under the direction of Mr. Wm. Body, are rushing the work with all possible diligence in order to get the ground under cover during this fair weather so that there will be no delay in placing the batteries. The Empire is the oldest worked mine in the district. The North Star mine has now on hand 4000 tons of good ore ready for the mill. The shaft is still being sunk, and is 150 feet below the 13 level. The 14 level will soon be opened up. The general appearance of the mine is entirely encouraging. At the last crushing of ore from the North Star the rock yielded \$60 per load in gold, without sulphurets, the latter being worth \$60 per ton after concentration. The Magenta company is still sinking the shaft and it is now down to a depth of 400 feet. There is very little trouble in handling the water in the Magenta mine, as a 6-inch pump does that work very readily. The Magenta joins the Empire mine, and from its ledge some of the richest ore ever seen in this district has been extracted. The mine has scarcely begun to be prospected.

THE BADGER.—The Idaho company has let a contract for running a ditch to convey water to the Badger Mining Company's property. Men are already at work upon the ditch. Work will be begun upon the Badger as soon as the new by-laws can be adopted. There are any number of demands for stock in this claim. A prominent and wealthy mining man of Grass Valley, several days since, told the owner of the Badger that he would take 5000 shares in the new company, and several days ago that same man authorized the manager to put him down for 10,000. Mr. Peter Johnston is constantly receiving letters inquiring about the possibility of obtaining stock in the Badger. The Phoenix Co. is running the north and south drifts ahead as fast as possible. The ledge in the drifts is 10 inches in thickness, and gold can be plainly seen in much of the quartz, while sulphurets of a high grade are plentiful in all of the ore. Stoping will be commenced in a few days, and soon a crushing will be taken out. The Phoenix is working 16 men. The New York Hill Co. is diligently driving the drift north in the 1300-foot level. There is a very rich ledge in the No. 10 drift south, but the ledge is small.

THE IDAHO.—This famous mine, "the world beater," as it is sometimes called, is looking well in the lower levels, and the 1700-foot level will be reached at no distant day. The Idaho has already paid over \$3,000,000 in dividends, besides giving constant employment to a large number of men. On Monday last the company declared their 195th dividend, the amount being \$3 per share on the capital stock.

The Crown Point is still working, and has been bonded for \$35,000, the entire amount to be paid in 100 days. The mine has been very rich from the beginning, all the ore being of good milling quality, with an occasional \$1000 or \$2000 worth of specimen ore taken out at a single blast. North Banner is still at work on the bottom drift, which is now in about 900 feet, showing a 4-inch ledge, rock from which is now being taken out for the purpose of being tested. Mr. John Skewes is superintending this mine, and four men are working in it on tribute. The Horse Shoe Company is now in a good ledge at the bottom of the shaft, and has let a contract for sinking the shaft 50 feet deeper. A tank is being placed in the shaft to catch the surface water. It is expected that the contract will be completed in about six weeks. Lone Tree shaft is down 12 feet below tunnel level, with a 2½ foot ledge in the bottom. Timber is already on the ground for the purpose of building a whim. As yet the company have had no water to bother them, and have taken out about 12 loads of ore, which will soon be crushed. J. G. Cohoe, a miner of experience and ability who has lately been operating in Nevada State, is now the superintendent of the Lone Tree, and he is pushing work ahead in good shape.

Plumas.

INDIAN VALLEY MINE.—*Greenville Bulletin*, Jan. 9: The "clean up" at this mine the first of the week was very satisfactory—better than expected. The drift from the bottom of the shaft east is now in 50 feet on the ledge, which maintains its width and good quality of ore. The pumps have been lowered for the sinking of the shaft. The Burleigh drills will be started this week, one in the shaft, one in the level going east, and another in the drift running toward the old Union mine.

San Bernardino.

GOLD EXCITEMENT.—*Cor. Calico Print*, Jan. 10: Your occasional correspondent visited a few days ago the New Eldorado. I can give no adequate idea of the extent of the new discoveries of gold in ledges. Gold has been found for eight miles in the south end of Providence mountain from what is known as Voshay Pass, the principal find being about three miles north of Granite Pass. I send a specimen from one of the small ledges to Mr. Van Briesen of your town who will no doubt show it to any person desiring to see it. There is one immense ledge running through the camp for about two miles, there being eight locations on it. The width of the ledge varies from 20 to 100 feet and is the best defined ledge that your correspondent ever laid eyes on. It is so far as ascertained marvelously rich. I have seen a number of assays ranging from \$50 to \$650 and as it looks

now it bids fair to be the largest gold mining proposition on the coast. There is a large quantity of small veins very rich, several good practical miners are chloriding with splendid results so far as can be ascertained by assays. The Mexicans who first discovered the mines are now shipping to tons of ore to Kingman and I understand some others will ship ore shortly. The Mexicans have picked from their shipping ore some two or three sacks of specimens which they would not take \$2000 for. I saw one of them horn out of two pounds of rock three ounces of gold. The new district was formed on the 9th of December, and is called the Arrow Mining District. I presume because it is only five miles from Arrowhead Springs. Mr. Sam King was elected recorder. The mines are situated about 16 miles south of Providence, and are only about 20 miles from the Atlantic & Pacific R. R.

Shasta.

WHISKEYTOWN.—*Shasta Courier*, Jan. 9: J. S. Strode has been crushing good ore for the past few weeks. He is now awaiting the arrival of some machinery when he will again set his mill in motion. Jackson Ferguson is developing some fine mining property on Mad Ox. He has a large ledge and plenty of good ore in sight. Foster, Heft & Co. have completed their contract for L. C. Graupner & Co. on their quartz mine on Whiskey creek. They have now a permanent ledge and a good prospect. O. P. Woodward has again turned his attention to quartz. He has a good prospect and if it holds out a fine bonanza will be uncovered.

IGO.—Jutton & Co. have finished crushing the Chicago ore at the mill, the returns from which have proved quite satisfactory, considering the price of silver. The concentrator has been shipped to Tuolumne Co., where it is to be used in a gold quartz mill. F. Shirland & Co. are preparing to run some surface silver ore through at the Chicago mill. Robinson & Co. have their Frue concentrator in place, and expect to get to running this week. They have out quite a pile of ore. S. P. Wright's last run of ore yielded handsomely, and he has more of the same kind in sight. J. B. Strong is running a tunnel to strike one of his ledges. Abbott, Hubbard & Co. are sinking on one of their numerous ledges, and taking out good ore. E. L. Bilou's arista is running on J. Hallister's ore. J. Woodfield & Son are sinking on their ledge. Assessment work and prospecting is in progress on several claims.

BULLION.—*Shasta Democrat*, Jan. 8: Tom Green was in town Monday and shipped another good sized chunk of bullion. Another carload of heavy machinery for Iron Mountain arrived at Middle creek a few days ago. We are told that placer miners about Buckeye are doing well this season, most of them making from \$4 to \$15 a day. Hart, Day & Co., purchasers of the Fleming mine in Old Diggins distric, have all their machinery on the ground. Andy File is re-arranging the mill at Lower Springs and will soon have it running in tip top shape. He intends to mill custom rock. A new strike was made in Clark & Co.'s mine at Quartz Hill last Monday. Tom Harrison uncovered it while pipping some surface ground. It is a strong vein of quartz and carries gold. We are told that the Iron Mountain Mining Company figures on expending nearly \$900,000 on the Lost Confidence before a dollar is expected in return, and altogether the machinery will require 100 cars to transport it to Middle Creek. The Sunny Hill and Bullychoop districts are just now attracting renewed attention, and we are told that quite a number of prospectors are operating in the belt between those two points and four or five fine prospects were struck lately. Bullychoop especially will be a lively camp next summer.

Sierra.

LAST MONTH'S CLEANUP.—*Sierra Tribune*, Jan. 8: The Young America turned out nearly \$26,000 for the December run. The December cleanup of the Butte mine is reported to have been \$49,000. A cleanup was made at the Cleveland mill last week after a run of thirteen days. The result was \$4600. The mill has but eight stamps running, and the owners of the mine are jubilant over the result. Considerable gold was lost in consequence of a defective plate, hence short run. Hereafter regular monthly runs will be made, and as the ledge improves with each stroke of the pick, the output promises to be something handsome.

BULLION.—*Mr. Messenger*, Jan. 9: There was a treasure shipment one day this week of \$70,000. The cleanup at the Young America quartz mine, for December, was \$25,000. The Cleveland quartz mine, after a run of 13 days with eight stamps, cleaned up \$3800. This is the first run made at this mine. Gravel at the Ruby, from the bench on the left side of the channel toward Rock Creek, yields \$4 a ear load.

Trinity.

NEW RIVER.—*Humboldt Standard*, Jan. 9: Harry Smith, who returned last week from New River, says the Mountain Boomer, Hardtaek, Uncle Sam and Grover Cleveland mines are running, and that 60 or 70 men are now at the camp. He says there is no snow between here and there and none at New River City, but at the Mary Blaine mine there are from six to eight feet. He tells us that Mr. Williams has been constructing an arastra at Battle creek, which probably is nearly finished now. All the miners that have cleaned up report good turnouts, and confidence in New River, Mr. Smith tells us, is unimpaired. Wm. Levasseur, who returned from New River Friday evening, speaks encouragingly of times there. He says there are about sixty men in the camp; that there is no snow between here and there, and that the trail is good. At the Mary Blaine mine the snow is half way up to the roofs of the houses and from six to eight feet deep, but there is none at New River. The mines are all running, he tells us, and at their last cleanup the Mountain Boomer assayed from \$70 to \$75 per ton, the Hardtaek from \$50 to \$60 and the Toughnut the one in which Mr. Levasseur has an interest, from \$10 to \$50. He informs us that the new mines are being opened up all the time. Nothing is being done at the Mary Elaine mine, but he tells us there is a feeling among miners that there is money in the claim and that only capital and energy are necessary to make it pay. Mr. Levasseur thinks the prospects of New River are bright, and with an abundance of money to develop the mines, they will be made to pay. Four arastras are there now.

DEADWOOD.—*Cor. Trinity Journal*, Jan. 9: Will this new year that looks so brilliant for Deadwood prove as successful as the one just passed? I, for

one, see no reason why the new year, 1886, should not be the most prosperous she has ever seen. Look back as far as 1875-76, when gold in quartz was first discovered, when nothing could be seen but the tall cedar trees through which the wild beast roamed undisturbed. All the old mines have proven extensive and valuable, and with numerous other prospects and discoveries yet to undergo development by the hands of over 250 men finds Deadwood more brilliant than ever in the year of 1886. Bullychoop will be a lively camp this summer. Much prospecting will be done in the district, and the developed mines, which show up flatteringly, will, without doubt, yield handsomely. Freezing weather during the past week has materially shortened the supply of water for hydraulic mining purposes. More storm is hoped for when a thaw comes.

RICH ROCK.—We learn that the quartz recently crushed at the Brown Bear mill on Deadwood, for Van Matre Bros. paid an average of \$115 per ton.

NEVADA.

Washoe District.

CHOLLAR.—*Enterprise*, Jan. 9: Nothing being done in the mine itself, operations being concentrated in the sinking of the Combination shaft deeper for the 3200 level. This work is getting along well, having obtained a depth of nearly 70 feet below the 3100 station or level. Some delay has been experienced in cutting out a tank station and in repairing a leaky section of one of the pump columns, but this is all right now, and the work going ahead as usual.

HALE AND NORCROSS.—Owing to the concentration of work and hoisting facilities in sinking the Combination shaft deeper, very little exploration work is going on in this mine. A bulkhead is being put into the 2500 level to shut off a heavy flow of water which has been coming from that quarter. This, if effectual, will shut off thousands of gallons of water from the big hydraulic pump and help matters in that respect considerably.

OPHIR.—On the 400 level, west crosscut No. 3 from the main south drift continues progressing toward the west wall in vein porphyry with streaks of low-grade ore. On the 700 level the repairs to the station at the main shaft, being made jointly with the Mexican and Union Consolidated Companies, are concluded, and the drift to the northwest for exploration purposes getting along well in favorable working ground.

MEXICAN.—The face of the lateral drift north from the east crosscut on the 500 level is in fine looking vein material—soft porphyry, clay and quartz; total length, 302 feet. The joint drift started on the 700 level from the Ophir shaft for the use of this, the Union Consolidated Mining Companies, is now in about 60 feet. Formation favorable.

CON. CALIFORNIA AND VIRGINIA.—Nearly 2000 tons were extracted from this mine during last week, including the 1750 level and the Jones lease section. That from the 1750 assayed \$23, and from the Jones lease \$19 per ton. On the 1650 level the northwest drift was extended 29 feet, making a total length of 402 feet.

YELLOW JACKET.—The old upper levels continue their liberal yield of low grade ore—some of it too low grade for profit. The Brunswick mill is kept supplied and a considerable amount of dead work is being done in the old stopes and workings, exploring for better ore and more of it.

GOULD AND CURRY.—Work is suspended on the 1000 level and concentrated upon the re-opening of the 600 level. The station at the Bonner shaft on this level has been repaired, and the drift west and southwest has been cleaned out and retimbered for a distance of 110 feet; total, 230 feet.

UNION CONSOLIDATED.—On the 700 level a drift has been started, running from the Ophir shaft northwest, for the use and at the joint expense of this and the Mexican companies. The usual progress is made in the explorations on the 500 level, with no new features to relate.

BEST AND BELCHER.—All work is now confined to the 600 level conjointly with the Gould and Curry, the 1000 level being abandoned. The drift west and northwest from the 600 station of the Bonner shaft has been cleaned out and retimbered 167 feet; total, 250 feet.

COMET.—During the week some extra good ore has been taken from this old mine on the west side of American Ravine by parties residing in Silver City. The ore shows well in free gold.

SIERRA NEVADA.—The main north lateral drift on the 520 level has been extended 53 feet, making a total of 1463 feet in length. The front, or face, is in a vein porphyry formation, dry and hard.

CROWN POINT.—Daily yield, 400 tons from this mine and the Belcher. Ore extraction from the 1700 and 1750 levels has been suspended during the week in Crown Point, but is resumed again.

ALTA.—On the 700 level the lateral drift north toward the Benton ground is making steady progress, and showing good streaks and bunches of low grade ore.

KEYES.—The Keyes mine in Six-mile canyon will be re-opened for active ore extraction shortly, all litigation being nearly at an end.

KENTUCK.—The Douglass and Rock Point mills are kept running on ore from the old upper workings of this mine.

MONTE CRISTO.—The old mine continues yielding ore enough to keep the mill running.

BELLE ISLE.—East crosscut from the end of the north drift 450-foot level has been extended 14 feet.

Bernice District.

MEN.—*Silver State*, Jan. 9: There are thirty-three men employed at mining and milling in Bernice district. The mill, which has been shut down for some time, will start up next week.

Columbus District.

HOLMES.—*Candelaria True Fissure*, Jan. 9: The Cramer has improved very much during the past week. The ore in the eastern end of this slope has widened to 6 feet, and the ore is high grade. In the first intermediate shaft level drift, to cut the Creer, we are making fair progress. In the Cross development we have 4 feet of good ore. Sixty feet west of Cross development we have a good prospect, from which we are taking some good ore. The Creer looks well in the slope. It is fully 14 feet wide and the ore

is high grade. We melted 15 bars of bullion to-day that will be assayed and shipped to you to-morrow. The south crosscut from the west drift from this winze is in 27 feet. We have started a drift on the ore cut by this crosscut, and have 12 inches of \$50 ore. The east and west drift from winze below the east drift on the 4th level both show a little high grade. The east drift from the north crosscut on the fourth level is in 57 feet, and the face shows some low grade ore. A small amount of ore is being stowed from the intermediate drift connecting the No. 6 and No. 7 winzes. We have started stoping some low-grade ore from the intermediate between the first and second levels west of the shaft.

GENERAL GRANT.—The owners of this property are preparing the ground to set up a winze. It is the intention to follow the ledge down 200 feet before crosscutting.

CLIMAX.—Kent & Co. are pushing the face of the tunnel as fast as possible. They expect to cut the ledge shortly. The face is still in extremely hard rock.

Esmeralda District.

AURORA.—Cor. Bodie *Free Press*, Jan. 9: Yesterday an order was issued by the Con. Esmeralda Co., for a force of eight men to go to work on the New Esmeralda Con., in consequence of which provisions, mining tools, material and men were to-day en route for the diggings, when the order was countermanded. The cause of such an immediate change in the program with reference to that particular property is not known, but the supposition is that it is proposed to defer developments thereon until the issue of patents is made certain. If the current report on our streets is true, that mechanics, carpenters and laborers have been engaged to execute the plans prepared for the hoisting works on the Humboldt Con., and that the necessary material has already been ordered, it shall not be long before the steam whistles shall make answer to those whose greetings are daily wafted in from the neighboring town of Bodie. During the past week strange and familiar faces of both laboring and business classes of people have appeared among us, the object of each evidently being to better its condition. Up to the present time not a pick has been struck for the London company. However flattering the prospects of Aurora may appear, perhaps it may be well for those living at a great distance whose finances are limited and who intend seeking employment here, to consider this cold fact, and await more substantial evidences of prosperity.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, Jan. 9: During the 10 days ending yesterday, ore shipments were made from the mines of the district to the two reduction works in town as follows. To the Richmond works—California mine, 27 tons; Continental, 1½; Hamburg, 6; Silver Lick, 49; Bowman, 5; Paul Fry, 9; Silver Connor, 80; Oriental and Belmont, 4; Prospect Mountain tunnel, 5; May, 15, and Independence, 10. To the Eureka Con. works—Hamburg mine, 31 tons; Alexandria, 5½; Dunderberg, 32½, and Bowman, 4.

Lewis District.

GOLD.—Battle Mountain *News*, Jan. 9: T. G. Morgan shipped last week one bar of gold bullion valued at \$2100, the result of one week's run at the Pittsburg gold mill. J. A. Blossom has purchased of Mr. Morgan a seven-twelfth interest in the mine and the entire interest in the Pittsburg gold mill, store, assay office and boarding house. The dispute between the Pittsburg and Dahlgren Mining Companies over their boundaries has been amicably settled, much to the disgust of the lawyers, who anticipated litigation.

Temple District.

STERLING.—*Pioche Record*, Jan. 6: A couple of weeks ago Hill Gear went over to Temple district to get samples from the ore-body in the Sterling (old Inca) mine, and the samples were assayed and shows as follows in silver: No. 1, \$37.70; sample consid; ered no good, \$631.49; picked sample, \$565.51; waste dump, \$40.83. The sample considered of no value, it is seen, nearly \$100 higher in silver than the picked sample. Two samples from the Standard mine, an adjoining claim, went \$120.93 and \$31.42 in silver.

ARIZONA.

CAVE.—*Clifton Clarion*, Jan. 7: Mr. Isaac Hann, in his claim four miles north of the Metcalf mine, came across a cave about 50 feet long, 20 feet high and 15 feet wide. Stalactites bearing rich copper hang from the roof and equally valuable stalagmites rise from the floor, presenting a sight at once novel and interesting. The interior has not been fully explored, but the probabilities are that Mr. Hann has a very rich find in store for him.

GOLD ROCK.—*Prescott Courier*, Jan. 8: The talk is that about 35 tons of gold rock from the Bullwhacker mine milled about \$75 a ton. Anyway, Messrs. Lester Jackson and John Curtin, who had the ore worked at the Sterling company's mill wear golden countenances. On Groom creek, Messrs. Cartmell and Hughes have just made a successful run on silver ore belonging to Messrs. Bones & Spencer and Charley Wallace. Their works consist of five stamps, two pans, concentrators and vats. W. C. Dawes, having finished working Peck tailings, is now pumping water out of the mine, and will shortly start a tunnel to strike the ore far below the surface. We believe he has done well working tailings. The Sterling mine is doing well by its owners, who are well satisfied of their ability to work it at a profit. Gen. Withers thinks of putting up a good sized mill in Cherry Creek district, to work gold rock. The Del Pasco mill is running; water is, however, scarce. Its owners have plenty of rich gold rock at their command.

THE LOST BASIN MILL STARTS UP.—*Mohave Miner*, Jan. 9: Stevens, Osgood & Co. have completed their new gold mill in the Lost Basin district, and had everything in readiness to start up last Monday morning. Beecher & Co.'s big team has arrived and is now hauling ore from the Ida mine to the mill, a distance of about five miles. On this mine Stevens & Co. now have fourteen men employed, which with those at work in and around the mill makes a total of about thirty on their payroll. There are now about fifty men at work in this district, which promises soon to become one of the most important in the county.

SOLD.—*Silver Bell*, Jan. 9: We are reliably informed that the Woodpecker mine, in Mineral Hill

district has been sold and part of the purchase money has been paid. The sale is an important one in the mine bids fair to become the mine of Arizona. It shows valuable ore throughout the entire claim.

COLORADO.

PAY ROCK MINE.—*Colorado Miner*, Jan. 9: 60 men are working on the Pay Rock mine. Each of the three main levels are being pushed ahead. The lowest level, viz. that from the ninety foot shaft, is producing more money in one month than it has in the last seven years. The last mill-run from this level gave returns of 1154 ounces in silver per ton. The ore in this level was always of very low grade, but has changed to that of the very highest grade, proving that depth is what the Pay Rock wants for larger and more permanent ore bodies than have existed in the upper levels.

DEMOCRAT MOUNTAIN.—*Pat's McNulty* is pushing work on the Bonanza tunnel, and is now on crevice matter, no count. The Fred Rogers vein, McVeaty & Welch are still pushing ahead on the east ridge, on a solid vein from four to twelve inches wide. The Lucky Hesperus is still furnishing its usual quantity of ore. McFadden & Co. have fine prospects on the West Rogers. The Dolly Varden and Whittier mines, Griffith mountain, will be developed to paying properties if energy and money will accomplish it. Reports from the Astor are to the effect that all the different workings of the mine present a good showing. Several new leases have been recently taken. We are informed that work will be resumed upon the Flagstaff group of mines in the spring. A tunnel was run to within about 100 feet of the Flagstaff when work ceased last fall.

IDAHO.

SMELTER NOTES.—*Ketchum Keystone*, Jan. 9: The North Star mine is daily shipping ore. The West Fork mine gives every promise of renewing its old reputation of taking out rich ore. Vice-President and Treasurer Wright of the Pacific M. & S. Co. arrived from Philadelphia. He finds the outlook more favorable than since the organization of the company. The Irvin mine, leased to Mike Carey, is in nearly three feet of ore, and shipping daily to the smelters.

FROM ATLANTA.—E. H. Pierson came over from Atlanta, arriving in Ketchum on Monday evening. He was on the road two days, coming over on snowshoes. About a dozen men were at work in the different mines about Atlanta when our informant left, but it was expected to put on about 12 more men in the Last Chance yesterday, which makes the total number of men at work at Atlanta about twenty-five.

THE FISHER MINE.—P. J. McDougal, who has been at the Fisher mine as foreman, came in on snowshoes Sunday. He says no work is now being done at the mill on account of the water supply giving out. He informs us that Superintendent Eugene Antz has solved the problem of saving the gold, and has made good returns from all ore crushed while the water supply lasted.

MONTANA.

ORE.—*Butte Inter-Mountain*, Jan. 7: For years the dump of the Anaconda mine has been accumulating till acres of the side hill below the mine are covered and piled up with thousands of tons of ore awaiting shipment to the smelter at Anaconda. As the railroad by which the ore is taken away runs above this vast accumulation it was no small problem as to the best method by which this pile could most economically be raised from the dump into the cars for transportation. But the ingenuity of Mr. Daly, the manager, was fully equal to the emergency. Knowing the expense of erecting and conducting a hoist on the side hill he determined to let the ore back into the mine and rehoist it in the same manner as that recently mined, and carry it to the ore house, when it can be shipped without inconvenience. To do this a level was run from the main shaft directly beneath the old ore dump and an ore chute established down to the level in such a manner that the ore can be loaded into cars and raised to the surface with the greatest ease. A new crosscut has recently been made at the 800-foot level opening up a 95-foot vein of rich copper ore, some of which is over 70 per cent copper. At Clark's Colusa the shaft is being timbered for a distance of 200 feet, (from the top to the 300 foot level) as the pressure on its old timbers was more than they could support. The formation is soft and the surface appears to be settling around the hoisting works, extending up to the Lickwater, just to the north. The new timbers now going in have the appearance of being able to stand no end of pressure and will without doubt remain in position safely for years. At the Lickwater a small force of men was put on at the beginning of the year, and as soon as the old ore dump is used up, which the Lickwater smelter is daily diminishing, a full force will be put on and the work pushed vigorously. At the Parrot the shaft has recently been sunk another hundred feet, making its depth now 400 feet, at the bottom of which a station has been established. The shaft here is about 20 feet from the main vein, and it is estimated that when a depth of 500 feet is reached, or 100 feet farther, it will encounter the hanging wall, which will facilitate somewhat the removal of the ore. The Lexington mill started up in full blast again to-day. Thirty of its 60 stamps have been idle for the past three weeks while repairs were being made.

PHILLIPSBURG.—*Cor. New Northwest*, Jan. 9: The Hope Mining Company have struck ore in the new shaft. It is of excellent quality and abundant in quantity. I will write full particulars about the lode in my next. Supt. Babcock will start the mill up on the 15th for a long and assured successful run. The Granite mine still continues to improve with development. The mill is running steadily on second-class ore. The bullion shipment for December, 1885, was over 100,000 ounces. The Buckeye Belle syndicate have suspended operations on the Fraction and Belle lodes. James Patten, of the Poor Man mine, says the vein never looked better—has a thousand tons of 40 oz. rock in sight. The crosscut to the level south in the Frisbee shaft has been completed. I hear that Eli Harland, Patten and Hynes have struck it rich in the 'Frisco,

NEW MEXICO.

BALD MT.—*Silver City Enterprise*, Jan. 8: Messrs. Porter and Smith have commenced work upon their claims at Bald mountain, and are taking out a grade of ore that pays them handsomely. Bell & Stevens are preparing to start up the Place and Johnson mill at Pinos Altos. They have about 350 tons of low-grade ore already out, which they will run through. J. W. Fleming has gone to Dos Cabezas to look after his Galena Chief mine, which is reported as looking well and producing enough high-grade ore to keep the mill steadily running. The old gold district of Pinos Altos bids fair to yet become one of the best producers in Grant county. It has been discovered that the iron pyrites are richer in gold than the free-milling ores. Los Cerillos remains the sluggish camp, albeit no district ever had more advertising. Unless the miners up there show some results before long, the people's opinion of that camp will be about the same as that held by the ancient Jews concerning a little suburb called Nazareth. The Conductor claim at Gold Hill, owned by Messrs. Norton and Cullom, is reported as being an unusually fine prospect. Recent work upon it shows a well-defined lead of high-grade ore, which will pay to ship. Owing to the Indian troubles it has been almost impossible to do any work upon the claims in this camp. We learn from O. J. Case, who has just completed the assessment work on a number of claims at Gold Hill, that the properties in that camp are looking better than ever. An average sample taken from the Mammoth and Big Boy claims owned by Mr. Case run \$157 in gold, and the lead is an immense one. Many tons of ore could daily be furnished a custom mill from this mine.

WATER CANYON.—*Sorocco Bulletin*, Jan. 9: C. B. Ott is running the concentrator with marked success. Wm. Smythe has located a fine chicken ranch in Copper canyon. Martin Joyce, A. Radcliff, Mike Wallace and A. Robinson paid Sorocco a visit this week to celebrate. Chas. B. Ott is now cross-cutting to the west in the Jane Bowman, at a depth of 60 feet, and is raising fine pay gold mineral. Maher and Nelson have a splendid showing in their Wide Awake mine, and are now making a road to ship ore to the Haase, Ott & Co. concentrator. The Graphic company have taken off their men from the Georgia Bell and the Iron Lead, but will resume work when the company has reorganized. Martin Joyce will next week commence work on the Steward and Joe Marks. This claim lies parallel with the Jane Bowman. Arthur Radcliff, one of the owners of the Little Nellie in North Fork, and the Jane Bowman, keep the Haase, Ott & Co. concentrator busy, running to its full capacity. The concentrates are shipped to this city for treatment. On the first of the year M. McLeish relocated for himself and Judge W. G. Lane of New Orleans, the famous Magnetic Iron lode, situated in Water canyon district. The ore from this claim is well known all over New Mexico, and specimens from it are sought for by those having mineral cabinets, owing to its magnetic polarity. In addition to the excellent iron which it affords, this mineral yields both gold and silver.

OREGON.

QUARTZ AND PLACER.—*Jacksonville Times*, Jan. 8: Less frosty weather and more rain is earnestly hoped for by placer miners. Prospecting continues unabated and several promising discoveries are reported. There is still considerable excitement on Wagner creek, where much prospecting is being done. Walsh & Bragdon have had 26 tons of tailings from their ledges on Wagner creek shipped to Medford for reduction. Oliver Boyd was over from Blackwell, and reports that district full of prospectors, some of whom report promising discoveries. Considerable snow lies on the higher hills surrounding the county, which will be quite acceptable to the miners later in the season. Most of the miners now use reservoirs, and with good effect. Much mining is done in this manner, that would otherwise be impossible. It is said that the machinery necessary to make the Medford quartz mill a ten-stamp one has been shipped from San Francisco, and will soon arrive. W. A. Cook was up from Foot's creek this week, from whom we learned that more mining is going on in that district than for several years past, and with good prospects. A partial cleanup was made at William Bybee's diggings, near Waldo, formerly in dispute with Wm. Newman, and about \$500 realized. Good reports are expected from these mines this season. A portion of the quartz mill for this place was hauled to town since our last report and the balance is expected here at once. The machinery will be put in position as soon as possible, and it will not be many weeks before quartz will be crushed. Our town is to be congratulated thereon. The company spoken of in the last issue of the *Times* as intending to prospect the old Bowden ledge on Jackson creek has been organized, and will commence operations at once. The company will be fully organized soon, and proposes to thoroughly prospect the above ledge, which was a paying one in early days.

PINE CREEK.—From a private letter from S. K. Senor to an acquaintance in Tuscarora, Nev., over date of Cornucopia, Oregon, December 22d, the *Times-Review* makes the following extracts regarding that section: Times are very hard here, no money in the camp, and but very little work being done. We have had no cold weather as yet, and although the snow is about two feet deep in town, six miles from us, down the creek, the ground is bare. There are not more than 150 men in the camp up to this time, but there will probably be an increase in the spring. There are 48 cabins and houses in the place with roofs on them, and 43 in Allen town, with some four or five between the two places. The Louisville company have located and surveyed a mill site in this place, at the junction of Elk and Pine creeks, and have erected an office upon the ground and have just completed a boarding and lodging house at the mine, and have commenced sinking on the Whiteman location.

UTAH.

SANDSTONE.—*Southern Utah Tribune*, Jan. 6: The outlook for the camp on the 1st of January appears more promising than at any time since horn silver was discovered on Tecumseh Hill. This flattering prospect has been brought about not alone by what the deep workings have been showing up, but

by dozens of the surface properties which were looked upon as mere prospects a few months ago and which are now looming up paying mines. The manner in which the California, Maggie, Buckeye, Savage and Last Chance have been panning out and the fine ore bodies encountered in the lower workings gives us every reason to expect that our mines are permanent, and that the sandstone ledges carry ore to a far greater depth than was asserted by a number of book-learned geologists and expert mineralogists who visited the silver-bearing reefs when the white metal was first discovered here. The ledges which they claimed carried ore simply near their outcrops are now being successfully worked on the four, five and six hundred levels, while in the Savage and Buckeye the main working shaft is at present down nearly 700 feet and the seventh level will soon be started on the ledge. The immense body of rich ore discovered and opened up in the Stormy King since last summer, and which lies but a few hundred feet south of the town of Silver Reef, is another most favorable sign of our coming events. The big showing that has been made within a few weeks past in the Butte, and in the Vanderbilt, Bavaria, Lamb & Steele, Crompton, Bonanza and other mines on the East Reefs, and the stacks of pay-rock piled on the dumps and appearing in the slopes of the Leeds, Honest Miner, Bonanza, Silver Gate, Little Chief and other mines on the White Reef is a most healthy indication of our future prosperity. The old theory that the ore in the sandstone ledges would change to sulphurets and be too base to pay as soon as water would be encountered, has been entirely exploded. The ore, 400 and 500 feet below where water has been found, continues to retain a chloride form and is as free as it was on the surface. The new leaching works which has just been completed here at a cost of several thousand dollars, is one of the most complete mining plants of the kind on the coast. If the managers are able to treat lowgrade ores as successfully as they have promised, the works will pay big and give a strong impetus to our mining interests. Capitalists, desiring mining investments, have been taking considerable interest in these matters of late, and unless silver drops way down below bed rock prices, we may expect a boom here before spring. The Stormont mill lost three days last week, by a freshet on the Virgin river breaking the dam, while the roads were rendered very bad by late storms, in consequence of which but an average of twenty-six tons of ore per day was crushed during the week. The ore, in the slopes of the Buckeye & Savage, has not been of as high a grade or as strong in the slopes as it was last month. The main working shaft is being sunk below the 600-foot level, and the ledge is showing some good indications of ore. The Christy mill, during the past week, averaged forty tons of ore per day. The mines are looking well and the ore produced is first-class.

REVIEW.—*Salt Lake Tribune*, Jan. 8: The first week of the new year has given us some snow, and the first real winter weather of the season. But in the valleys the cold has been by no means severe, though some deep downward excursions of the thermometer are reported from the hills, one of upwards of thirty degrees below zero. The receipts of the metals in this city for the week ending January 6th, inclusive, were: Of bullion, \$39,522.11, being the smallest for a long time, but as the banks adopted the Saturday holiday, there were really but three business days in the week; of ore, \$10,900; total, \$50,422.11. The Ontario makes no report this week, the mill, we understand, being stopped for some needed repairs and renovation after a long run. The Horn Silver product for 1885 is given by Mr. Doody (for three months) at 4,905,932 lbs. of refined lead and 123,062 ounces of silver. There is nothing new to report locally, except that the development work is going forward steadily, and there are hints from time to time of the nearness of the new workings to the expected ore bodies. The product of the Hanauer smelter for the week was four cars of bullion, \$12,550; of the Germania, six cars, \$17,499.11. Ores received were McKay & Revolution, \$2400; miscellaneous, \$16,300; Queen of the Hills, Idaho, \$1200.

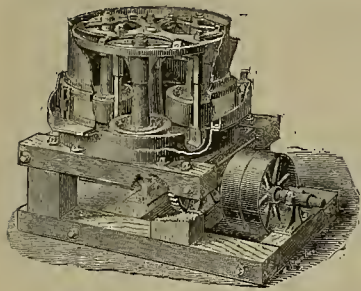
THE NEW MARSAC.—*Park Record*, Jan. 9: It was reported some time ago that the Marsac mill would start up about the 20th of January, but they will not be able to commence till about the first of next month. The 20 old stamps have been fitted up and to more added, so that the Ontario has only 10 more than it. One hundred and twenty men are now at work, and shoving things along to a rapid completion. The cooling floor is finished, and everything about the room has a uniform appearance, and is not chopped and broken up like some. There will be no salt stamps, but the Cornish rollers will be used in their stead. Many improvements have been made, on the manner in which the work is done at the Ontario mill, and the new one will be better and handier. It will take about 70 men to operate it, and when finished will be one of the best and most complete mills ever built in the Territory.

WASHINGTON TERRITORY.

STRIKE.—*Colfax Gazette*, Jan. 9: A private letter received in this city brings intelligence of another richonike in the old Dominion mine, in the Colville reg. The new find is seventy-five feet north of the upper shaft and proves to be a continuation of the main ledge, materially enhancing the value of the property. The last discovery is what is known as grey horn silver, and is very rich.

SILVER.—*Spokane Falls Chronicle*, Jan. 9: From six assays taken from the west vein on the 'Young America,' the average was \$81. The main vein shows eight feet of solid metal, which assays from \$50 to \$119 silver to the ton. The silver is quite evenly distributed through the mineral and it requires very little sorting. Richard Chilsom estimates the dump to contain 1000 tons of good ore. A fine body has been found on the face of the cliff 600 feet to the south. There are eight men at work for the company now and more will be added shortly.

GOLD.—*Skagit News*, Jan. 9: James McCauly, another of the Ruby creek miners, is spending a few days in town. Mr. McCauly exhibits some very fine nuggets of gold weighing from \$3 to \$6. He confirms the report of Giddings as published last week, McCauly and his two partners have taken out 140 ounces of gold this season, rating over \$17 an ounce, and amounting to over \$2380 for the season's work. McCauly has been in the mines since 1879, and had not seen a white woman for three years. Last winter he spent in the mines alone, and for months saw no human being.

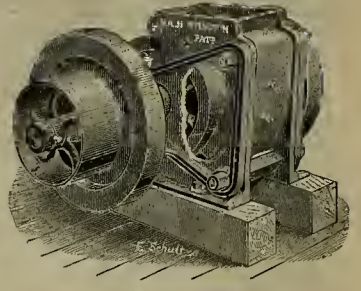


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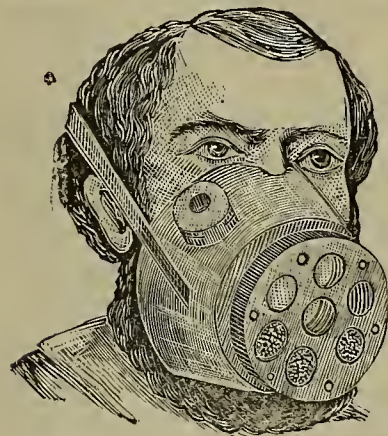
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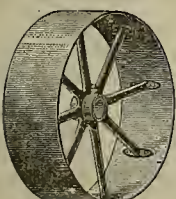
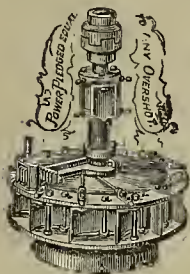
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[From the Engineering & Mining Journal, Aug. 8, 1885.]

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Market Reports.

Lumber at Wholesale.

The Redwood Lumber Association has established no prices since the first of the year.

Redwood.—Cargo prices are at present as follows: Rough, merchantable, 2 1/2 ft. x 12 ft., \$13.00; Rough, clear and surfaced, \$23.00; 1x10 Rustic, No. 1, \$24.00; 1x10 Rustic, No. 2, \$19.00; 1x8 Rustic, No. 1, \$22.00; 1x8, tongued and grooved, \$21.00; 1x4, tongued and grooved, beaded, \$20.00; 1x3, battens (board measure), \$30.00; Shingles, 16 in. x 36 in., \$11.00.

Pine.—Rough, \$15.00; No. 2, \$12.00; do do in lengths, \$13.00; rough, 40 to 50 ft lengths, \$10.00; do do 50 to 60 ft, \$17.00; T and G Flooring, 1x6, \$26.00; do do 1x6, \$25.00; do do 1x4, \$24.00; do do No. 2, \$21.00; Vertical Grain T and G Flooring, 1x6, \$30.00; do do 1x4, \$28.00; Stepping, \$37.50; Furring, 1x2, per lineal ft., 2 c.

Lumber at Retail.

Prices fixed by the association April 1st. are as follows:

Pine, Rough.—No. 2, 2 1/2 lengths, 12 00
" " 2 1/2 lengths, 13 00
" " 40 to 50 feet lengths, 16 00
" " 50 to 60 " " " 17 00
T. & G. Flooring, 1 x 6, 20 00
" " 1 1/2 x 6, 23 00
" " 1 x 4, 25 00
" " No. 2, 21 00
Vertical Grain T. & G. Flooring, 1 x 6, 30 00
" " 1 1/2 x 6, 32 00
Stepping, 37 50
Furring, 1 x 2, per lineal foot, 01
Redwood, Rough, No. 2, 17 00
" " Surfaced, 23 00
" " 1 x 6, 25 00
" " 1 x 4, 24 00
" " T & G, 6 in. 12 ft. and over, 28 00
" " 7 to 12 ft., 25 00
" " under 7 ft., 20 00
" " Rustic, No. 2, 25 00
" " T. & G. Beaded 12 ft. and over, 30 00
" " 7 to 14 ft., 25 00
" " under 7 ft., 20 00
" " Siding, 1 in., 22 50
Pickets, Fancy, 25 00
" " Rough Polished, 15 00
" " Square, 14 00
Battens, 1/2 x 3 per lineal ft., 01
Shingles, 11, 3 25
Laths, 11, 3 75
Dunnage Boards less 5% delivered, 16 00
Price subject to change without notice.

Coal.

PRICES "TO ARRIVE."

	Per Ton.	Per Ton.
Australian	\$0.00 @ 12 1/2 Cardiff	\$0.7 @ 7.00
Liverpool Steam	6 1/2 @ 7 1/2 Lehigh Lump	13.50 @ 14.00
West Hartley	7.00 @ 7.25 Cumberland bk	8.00 @ 8.25
Scottish Splint	6.50 @ 6.75 Egg, hard	10.00 @ 10.50

SPOT PRICES.

	Per Ton.	Per Ton.
Australian	\$0.84 Cardiff	\$7.00
Liverpool Steam	5 7/8 Lehigh Lump	14.00
West Hartley	7.50 Cumberland, bulk	8.50
Scottish Splint	6 7/8 Egg, hard	10.50

Iron.

PRICES "TO ARRIVE."

	Per Ton.	Per Ton.
Eglington	\$21.50 Clay Lane White	\$22.00
Glenbrook	22.50 American Soft No. 1	23.00
Shotts No. 1	24.00	

SPOT PRICES.

	Per Ton.	Per Ton.
Eglington	\$22.50 American Soft No. 1	\$24.00
Glenbrook	23.00 Clipper Gap, No. 1	24.00
Shotts No. 1	24.50 to 1	25.00 @ 25.50
Clay Lane White	24.00	

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Jan 14, 1886.

ANTIMONY—Per pound. 12 @ —
BALLET—12 @ —
COOKSON—13 @ —
BORAX—Refined. 6 @ 8
IRON—Glenbrook ton. 23 00 @ —
Eglington. 22 00 @ —
American Soft, ton. 24 00 @ —
Oregon Pig, ton. — @ —
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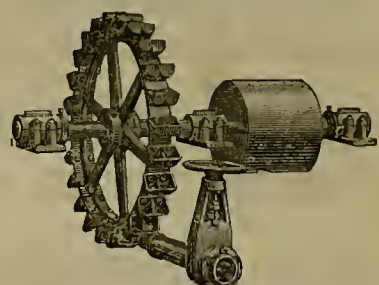
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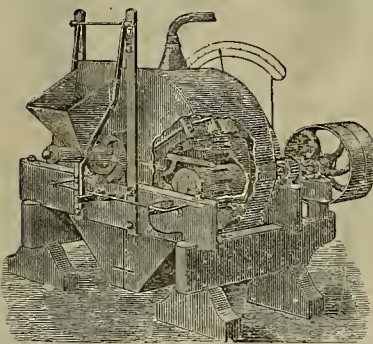
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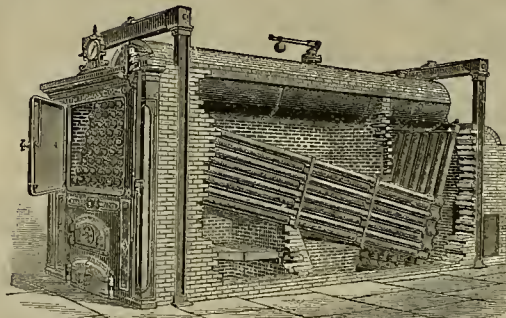
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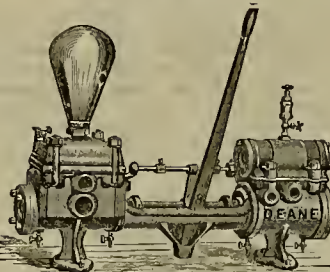
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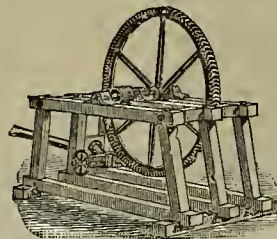
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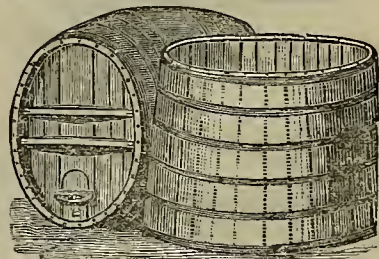
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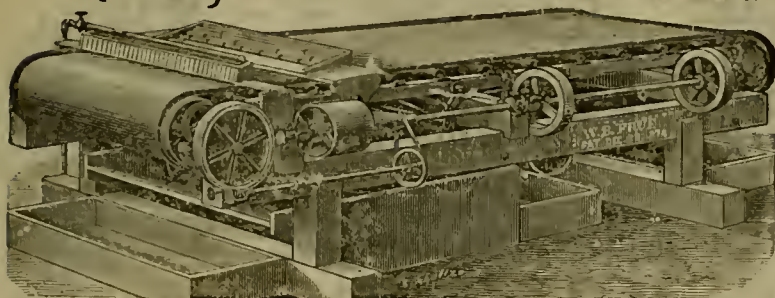
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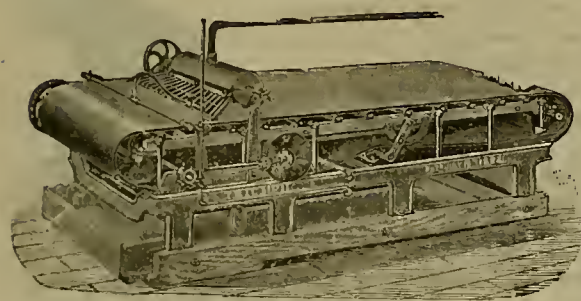
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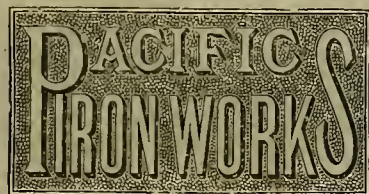
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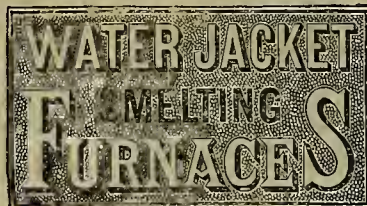
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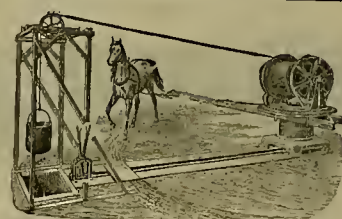
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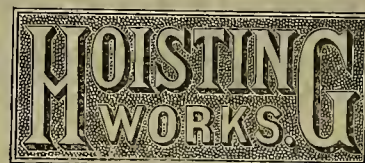
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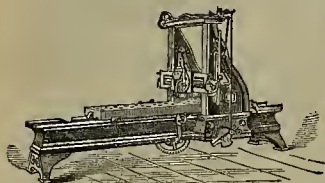
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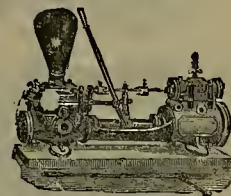
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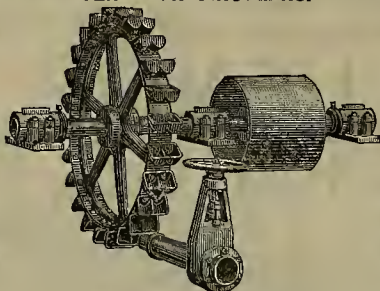
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An Illustrated Journal of Mining, Popular Science and General News.

MINING REVIEW EDITION--TWENTY-FOUR PAGES.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, JANUARY 23, 1886.

VOLUME LII
Number 4.

Prehistoric Printing.

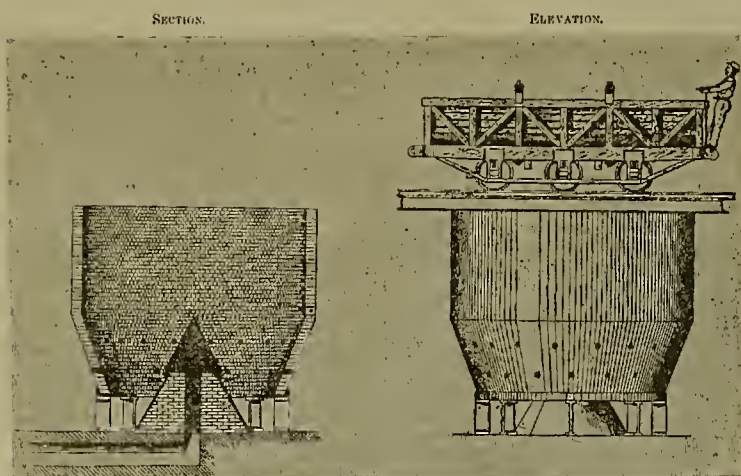
There are several places in the State of Nevada where there are "pictured rocks," the work of the aborigines. One of these places is near Buckland's ranch, on the Carson river. There are also several such rocks a mile north-east of Verdi. We give an engraving of one of the group of rocks found eight miles from Buckland's ranch. The drawing was made by Miss Mary Marsh, and the engraving was made from her drawing for the *Reno Gazette*. It is a basaltic rock about four feet high and four feet wide. The largest one is within a couple rods of the river. It is eight feet long, five and a half across, and fully five feet thick. It is of a dark reddish or dirty brown color and very heavy. It is of lava formation, probably, and has been worn smooth by water. All around lie similar rocks, together with large and small boulders of pure granite. The rock spoken of has a oblong hole about two inches by four, and sixteen inches deep at the left end, which has been chipped out before the lines were drawn, as it seems to be the starting point for the whole scheme of the artist. The rock lies with a broad, smooth top face, at an angle towards the south, and its top and the sides are covered with lines and marks that convey to the present generation no intelligence whatever. A line half an inch wide starts at the hole on the left, and hending downward, forms a sort of border for the letter until it reaches midway of the rock, when it suddenly turns up and mingles with the hieroglyphics above. Two or three similar marks cross on the top of the stone, and one runs across the north side losing itself inside a coating of hard, dry moss that seems as old as the stone itself. From the line at the bottom hangs a few scallopy looking marks that may be part of the picture, or may be a fringe or orna mental.

The figures are not those of any animal, bird or reptile, but seem to be made up of all known forms and are connected by wavy snake-like lines. Something that might be taken for a dog with a round and characterless head at each end looking towards you occupies a prominent place near the lower line. The features are all plain enough. A deer's head is joined to a mixed up patchwork that has something that may be meant for four legs beneath it. Bird claws show up in two or three places but no bird is near them. Snaky figures run promiscuously through the whole thing. A circle at the right end has spokes joining at the center and running out and losing themselves in the maze outside.

Similar marks cover a whole side of the creek's bank, where the north fork of the American has washed a smooth ledge bare for many feet in height and length, at Soda Springs, 11 miles from the Summit, C. P. R. R. Near the big Verdi rock are two less than half the size, which have been used as canvas by the ancient artists. The larger of these two has less than half as much as the one described, and the least has less than half what the other has. In fact one scroll, a foot across, is all it bears. A small hole in the upper right hand corner furnishes its start also, and all its lines are run at tangents and angles, making a double-ended kind of an arrangement of many-headed arrows, pointing three ways. A snake like scroll lies

between the two arms, but does not touch them. Below are blotches, as if the artist tried his tools. This region has been roamed over by the Washoes from a remote period, but none of them know anything of the works. One who

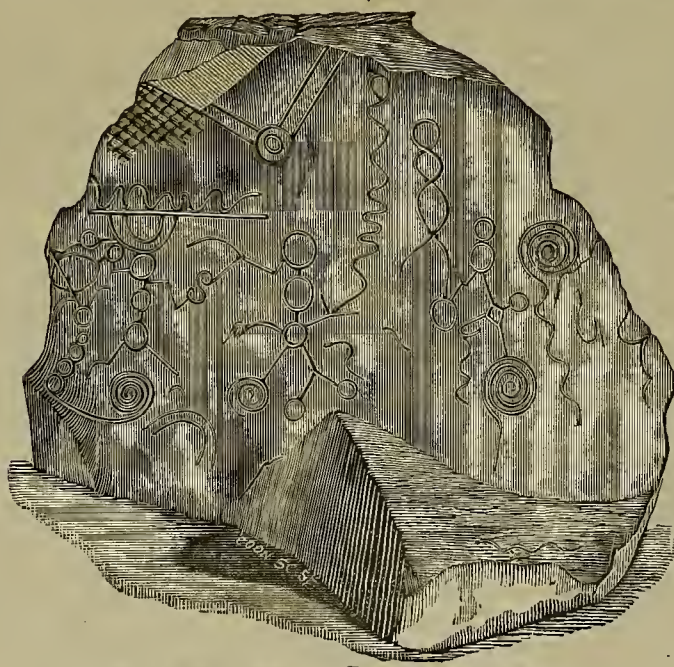
It is estimated that since the gold mines of Gilpin county, Colorado were discovered in 1859, they have produced \$60,000,000. During the year 1885 the stamp mills treated 158,528 tons of ore of the value of \$1,017,281, and the



FURNACE FOR ROASTING ORES.

has gray hair and as many wrinkles as hairs, who is bent with age, toothless and almost blind, and who is said to be 100 years old, was led to the spot, and said he saw them a heap

mills saved 17,339 tons of tailings or concentrates of ore crushed of the value of \$355,752. There were sold 16,673 tons of smelting ore for \$1,251,817. The placer claims produced \$14,



INDIAN RECORDS ON THE ROCKS IN NEVADA.

long time ago, when he was only a few summers old and they looked just as they do now.

THE Bonanza King Company's mine, in San Bernardino county, is looking fine. The old mill site is being cleared off for a new mill. The miners say that the miners are all looking as well now as any time during the past two years.

318, making the total product of Gilpin county for 1885, \$2,639,168.

THE possibilities of quartz mining that can be realized in California may be understood by the statement that ore being taken out now from the Sierra Buttes that yields only \$5.50 per ton pays a good profit, as the mining and milling of the same costs but \$3.09 per ton.

Ore Roasting Kilns.

For roasting ore in kilns various types of furnaces are given in the works on metallurgy, their general character being of masonry with both bosh and shaft. The kiln which seems to meet with most general favor for roasting iron ores is known as the Gjers calcining furnace, in the Cleveland district, England. These have a bosh and shell of sheet iron supported from a mantel resting on columns or brackets and are lined with brick. A cone of masonry covered with iron plates is placed at the bottom, and the furnaces are often provided with iron hoods or chimneys. One of the American modifications of this furnace was described by John Birkinhine, of Philadelphia, before the American Institute of Mining Engineers, and is shown in elevation and section in the accompanying engraving, supported on columns, and arranged to be filled directly from railway cars, which pass over the top. These roasters have perforations in the shell and lining which serve as poke-holes. At the Colebridge furnaces, Lebanon, Pa., there are 16 roasters arranged in this manner. These kilns are 17 feet diameter at bosh, and 15 feet, 17 feet, and 18½ feet high.

The ore roaster is covered with a hood of wrought iron, and also has a wrought iron draught stack controlled by a damper. The base is of solid masonry, circular or octagonal, covered with cast iron plates. Cast iron plates surround the base of the kiln to facilitate shoveling the ore. The hoiler iron for shell cone and draught stack for ore roaster weighs about 16,000 pounds. Some of these roasters are made without any hood or cover above the charging level. In many cases the poke-holes are simply circular openings cut in the shell and extended through the lining.

Our Mining Review.

We devote a large part of the space of the double edition of the MINING AND SCIENTIFIC PRESS this week to our annual review of the mining industry for the past year. It was necessary to defer this until the latter part of January, in order to get the statistics of different sections, without which such a review as we care to give would be incomplete. The reader of the PRESS this week will have before him a condensed account of the doings in all of the prominent districts and camps of the coast, with the result of their past year's work, and the prospects for this year. In order to give suitable space to this review, we have given only one page, instead of two, of our usual summary of current mining news.

The PRESS is in a position to keep track of the events connected with the mining industry, and this review should be read by all interested in mining development. It shows what all the mining communities are doing, and how one compares with another. Our own State of California still maintains the position it has held for some years, but other regions are gaining rapidly in product and our capitalists should observe what the efforts of others have done in making fortunes in other places. The PRESS of this week is worthy of preservation for reference, containing as it does so many facts and figures, and so much general information concerning the precious metal mines of the United States.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Formation of Mineral and Metalliferous Veins.

The New Hypothesis vs. the Old.

EDITORS PRESS:—Seeing that Mr. Blackburn, of Idaho, has written you an article on this subject—published in the PRESS of Dec. 5th, 1885—though he does not refer directly to our article in the issue of Sept. 19th, 1885, yet we apprehend his aim was to confute the new hypothesis by a rehearsal of the old. It is human nature to meet each new discovery with opposing forces, nevertheless truth will prevail.

With regard to the new hypothesis, while we do not claim it as a scientific fact, yet we esteem it worthy of careful consideration, and so plainly demonstrated by the plate, on a small scale, as to set aside any doubts regarding its possibility.

So far as I am aware, all writers on this subject allow that the metals existed in the globe from its inception; then, they presume they were formed into veins afterward. Certainly if the law of affinity holds good on a large scale as it does on a small one, as is so beautifully shown on the plate, it would be contrary to the laws of nature for metals to take any other than their present form in the beginning; and no subsequent eruption of the earth's crust would be necessary to receive them from the percolating waters.

If the old hypothesis were true we would expect to find vein matter alike from each wall towards the center, or else a stratified deposit from the bottom upward. We would also expect to find that the mineral waters had overflowed the crevice, especially in uneven ground, and formed an incrustation of ore on the bed-rock, and even on pebbles or boulders near the vein. Such deposits have never come under our observation. We would likewise expect to find the walls matched, as a protuberance on one wall where a cavity existed on the opposite one, yet in our experience the contrary is the rule; a bunch of ore or even a chute of considerable length forms a cavity in each wall.

We do not understand why any author should attempt to cite the geysers of the Yellowstone National Park, or other existing hot springs, in favor of the old hypothesis; since they serve more definitely to prove the contrary. Who has ever learned of a hot spring filling a crevice or crater with precious metals? If such were the case, miners would have sluice boxes or arastras on every hot spring in the mountains.

The fact that metals exist mostly in mountainous regions is undoubtedly due to the natural tendencies of electric currents to follow the course of metalliferous districts passing from belt to belt, as from one cloud to another, and producing those wonderful mountain upheavals in their path.

One of the greatest obstacles in the way of the new hypothesis, and one which for a time seemed insurmountable, namely,

Contact Veins.

Can probably be accounted for in a very reasonable way. In Vipond's Mining District, ten miles from Glendale, M. T., is a perfect "blanket ledge," the Lilly, situated on the west side of Sheep Mountain. The ledge is from six to eighteen inches in thickness, carries good shipping ore, is on a lime foot-wall, but has no other covering than from two to four feet of slide rock that has broken off and slid down from the top of the mountain. Now the question is, where is the hanging-wall of this vein? We would venture to presume that during an eruption of the ground by earthquake the hanging wall either sunk or else separated so far from the vein as to form the high, steep mountain on the opposite side of Blue-bell gulch. But, to say the least, some terrible eruption has denuded the vein of its west wall. Now suppose such an action had taken place in some of the older formations, say in granite, then at a later period a lime formation was deposited on top and takes the place of the missing wall, here then would be a perfect contact vein.

The value of a true theory on this subject is certainly momentous, as the amount of capital and labor annually expended without realizing any returns might be counted by millions; and if metalliferous veins are merely "filled waterways," the filling of fissures that occurred promiscuously, then we may look for no natural guide to the deposits of wealth in the earth's crust, and must trust to blind Fortune to lead us to the coveted treasure.

But on the other hand, if "Nature does nothing in vain," she must have left us an index to her stores, which, by learning to read her language correctly, the student of her laws may seek and find mineral deposits just as accurately as the astronomer discovers a new planet by its influence on those under his observation. And though it may require years of study and close observation to reduce this new hypothesis to a science, yet we believe the task will be no more difficult and much more beneficial than that of botany, astronomy, or other natural sciences.

It seems to us unreasonable to conceive of boiling water rushing up from the bowels of the earth charged with heavy metals in solution, and depositing the richest stores, in many cases, near the surface, while the lighter matter, har-

ren of the precious metals should remain at the bottom. Again, in cases where a vein changes, gradually blending with the "country rock," until at a depth of but six or eight feet below the surface, it is completely lost. From whence came the "hot waters and pressure," to deposit this mere foundation of a vein on the surface?

If fissures in the rocks were filled by metalliferous matter from percolating waters, or to use an original phrase, if the metals were sweated out of the country rocks, why did not this sweating process take place on the surface? For instance, on hillsides just as well as on crevices immediately at the surface? If such were the case we would find mountain sides in every mining locality beset with quartz and ore.

Now, one word more with reference to our "tin-type" plate (sent the editor with our first letter, and referred to at the time), and we are done. As the affinity of metals is shown to draw them into veins, under favorable conditions, so we think a continuation of those conditions would draw it into bunches. The spurs we believe to be "feeders" to the main vein, consequently a large bunch or "pocket" is formed where a spur comes in, and as the force or affinity is thus increased in proportion to its size, therefore a subsequent effect of a large bunch would be to absorb all adjoining minor deposits from its main vein, thus leaving a barren gangue to fill the crevice between the pockets or chutes; hence, "spotted mines."

Now, Mr. Editor, we draw our communication to a close, leaving our new hypothesis to the careful consideration of your conscientious readers, cautioning them to ever hear in mind the profound words of the philosopher: "Great men's names are too frequently used as a stronghold for error." HENRY W. BROWN.
Glendale, Montana.

Montana Mines.

The Anaconda Mine and Smelters.

[By Our Traveling Correspondent, R. G. HUSTON.]

Anaconda is located 22 miles southwest of Butte, and contains, at the present writing, a population (estimated) of nearly 4500. The smoke arising from the smelters enables a person to locate the town from a long distance. It is the terminus of a branch of the Utah Northern, and there is no doubt that it contributes largely to the prosperity of that road. The growth of the town is certainly phenomenal, as it is only two years old. The future outlook for the town is surely a bright one, for the smelting works that brought the town into existence and gave it the name it bears, are of the most extensive in the world, and while the company have one of the largest and best developed mines in Butte, they also propose to treat custom ore that may be brought to them. Having ample means and facilities for this, it will give miners who have properties in the vicinity a chance to develop their mines and get their cash as they progress.

The Anaconda Mine

Is located on the top of the mountain east of Butte, half a mile from the center of the town, and was purchased four years ago by Messrs. Haggin & Tevis, of San Francisco. Since that time they have invested over \$2,000,000 in improvements on the mines and works to reduce the ores, and it is now one of the most valuable copper mines in the world.

The shaft is now 1000 feet deep and is divided into three compartments, two for hoisting cages and one for the pump and air pipes. Crosscuts have been made in the vein from east to west at every 100 feet below the surface and stations put in, and every contingency has been provided for systematically working the mine, both for speed and safety, as the ore body is of great width and uniform richness, especially in the lower levels.

Down to the 200 foot level the percentage of silver was very small but below that point it increases and is now found to the amount of from 10 to 30 ounces per ton. It is this fact that enables the Anaconda Company to sell their copper at the same rate as Eastern copper, which is produced at so much less expense. The St. Lawrence shaft penetrates the vein at another point and has also a complete steam hoist and it is connected underground with the main shaft. The large air compressor at the main shaft supplies both mines with compressed air for drills and fresh air for the miners. Each of these shafts have large ore chutes and the Utah Northern Railroad have a switch laid and run their cars under these chutes, and although each car has a capacity of 20 tons, it does not take three men over one minute to load a car. These cars are also provided with a patent dumping apparatus and one man can dump it easily in one minute's time, the cars being run up to a grade, to a height of 75 feet above the main track and then weighed and dumped.

The Reduction Works.

The rock breakers are fed automatically from these chutes and dropped in bins. From thence it is drawn into small cars and again weighed and dumped into a chute which carries it to the rolls. These reduce it to a fine sand and it is sieved and the course is returned to the rolls for further reduction. It is then passed in the jigs some 300 in number. The water in these being kept constantly agitated, the valuable portion of the product sinks to the bottom and the top is carried off as waste.

The ore passes from the bottom of the jigs to receiving troughs and from these is shoveled into cars and conveyed to the draining floor and thence to the reverberatory calcining furnaces where it is desulphurized and dropped to be taken by the matting furnaces where it is separated from the slag by skimming. It is then drawn from the furnaces and run into bars and then taken to the matte house and run through a rock breaker and crushed in small pieces and sacked in sacks of 100 lbs. each and shipped to Swansea for further reduction. It seems as if so large a firm as this one, could put in machinery and make a clean separation of the different precious metals at a profit to themselves. The immense production that they handle would certainly be a very large object in building works of that kind but as I am well satisfied that they understand copper mining and reduction of copper ores better than I do, I will withdraw my suggestion. Their electric light and a portion of their machinery is run by water power derived from a ditch from Warm Spring creek which is brought around and runs two turbine wheels 30 inches in diameter. The fact that they have 70 feet fall will give some idea of the power they get from these two wheels, that, in connection with an immense engine, run all the machinery in these works. The present capacity of

The Concentrating Works

Is six hundred tons daily, but when the new building three-quarters of a mile below, so as to admit of taking up their water-power and using it a second time, is completed and equipped with the requisite machinery, their capacity will be doubled twelve hundred tons per day: a small mountain in itself. When one thinks of this amount being handled every twenty-four hours and the full seven days for a week, and continued right along, it runs into immensity. Some figures showing the size of

Some of These Buildings

Would probably be interesting. The old Concentrator building is 175x220 feet. The new one below is a duplicate of this. The smelter building is 175x490 feet. It required thirty-six tons of iron roofing to cover this one alone. The ore house is 80x220 feet. The new smelter is 131x396 feet. The new building for calcining furnaces is 68x296 feet. There are, all told, thirty-six calcining furnaces, twenty-six matting furnaces and one Bruckner cylinder. Millions of common brick were used in the construction of these, and many hundred thousand of fine brick, all of which, until lately, were imported, making them very expensive; but a quarry has been discovered near Dillon which has all that is requisite for the making of fine brick there, which will be a large saving to the smelting company.

There is a rumor here that the Northern Pacific is intending to build a branch into Butte, and thus connect directly with their line, and I believe preliminary surveys have been made with that intention. If such a thing should be done it would no doubt be a profitable enterprise for them, and a portion of the traffic would be diverted in that way to the profit of the North Pacific Co., and St. Paul merchants and business men also.

I almost think sometimes that our California business men have woefully

Neglected Their Opportunities

In this Territory, as many of the lines that we should be the main supply of have scarcely a representative. It is a well known fact that Chicago commercial men literally run this Territory in almost every line. Probably there may be a discrimination in freights that will account for a portion of it, and I should be glad if it is so, for then there would be a valid reason for it.

Anaconda is well supplied with business houses of all kinds. Hotels and boarding houses are here in profusion, as are saloons, general merchandise, hardware, variety and dry goods stores, bakeries and restaurants. Messrs. Hoge, Browner & Co., of Butte, have a branch bank here to care for the financial interests, and Messrs. Wingard and Thomas supply the Anacondans with fine horses and buggies to take their airings in the valley below. The press is ably represented by the Leonard Bros., proprietors of the *Anaconda Weekly Review*, and are very pleasant gentlemen, on whom I made a number of calls and found them very enthusiastic concerning the future of their town. The town is thus far very healthy and there is no apparent reason why it should not continue so for all future time, as there is enough wind stirring all the time to carry away the fumes from the smelters, and consequently they do not have to suffer with that as most towns do where the smelting interest is represented. The altitude is less than Butte, and vegetables of all kinds can be raised here—in fact it was a farming community before they concluded to build the Anaconda smelter.

Barriers for Debris.

A Suggestion as to their Construction.

EDITORS PRESS:—In the PRESS of Dec. 12, 1885, page 386, there is correspondence on the debris question from the pen of Mr. N. Cadwallader, of San Jose, Cal.

The positions of Mr. Cadwallader as to the benefits to be derived to the people of the State from the starting up of mining afresh, to the labor to be employed, to the materials and sup-

plies to be furnished and consumed, to the vigor that will be infused into other industries from the increased output of gold, are not controverted and will not be denied. The prosperity of one portion of the State is the prosperity of the whole, and a portion cannot be injured without injuring all. Mr. Cadwallader may well hold that if this State was owned by one person, or by one company, mining would not be discontinued from any damage that would be done.

In this correspondence Mr. Cadwallader mentions a plan in which there is an erection of a dam at a suitable place where solid bottom could be obtained. It is submitted that the word dam as used in this connection for restraining mining detritus, is a misnomer and is misleading. As usually understood a dam means some kind of a construction or obstruction to confine or restrain water, or to obstruct or to restrain its flow. We hear and know of dams to confine and restrain water from early youth; hear and know of their breaking away and of great damage being done; and when most men hear or read of dams they associate with them the idea that they are liable to destruction, and to cause the loss of life and property. This is especially so when judges of the great learning and ability of Sawyer and Dady stumble, and make a hotch of their discussion of dams to hold detritus, as shown in their opinions in the Woodruff case.

The above was suggested by an editorial in the *Sacramento Record-Union* of December 29, 1885, headed "A Dam Project," written evidently by one who speaks as by authority, in at least by saying what shall not be done.

But opinions sometimes change with circumstances. Allow me to give another plan which, possibly, the editor, as above, may not characterize as another "Dam Project." Selecting a place on the Yuba, where one bank at least is a bluff from 500 to 800 feet in height, at 300 feet above the bed, channel out the rock horizontally for a distance of 1000 to 1200 feet by 300 feet back, leaving the side of the mountain standing on pillars on a slope of 20 deg. descending toward the stream. Then properly place in round numbers 1,000,000 lbs. of powder at the back of the cutting and in the pillars and explodes all at one instant by electricity. The mountain side could be slid and thrown into the river and the gorge filled. With the advantages that could be taken, 1,000,000 lbs. of powder should easily handle 10,000,000 tons of rock. This, considering the voids or empty spaces, would equal 150,000,000 cubic feet, and would fill a space of 400 feet in breadth by 250 feet in height by 1500 in length—more than a quarter of a mile. The bluffs on the river are to be found in more places than one. The land on the banks of the river to be flowed is of no present or prospective value. The power of thousands of horses runs in ditches near by; labor in great abundance is seeking employment; powder (30 odd carloads) can be brought and a barrier of this kind which for years will act as a strainer can be put in at a cost that would be small compared with the loss of this mines.

Mr. Cadwallader suggests one way; the above is another. It is quite probable that neither is the easiest, cheapest or best. To me it would seem that the true solution of restraining mining and other detritus lies along the line of the suggestions and advice of the late General Alexander, of Colonel Mendell, Captain Eids, and other engineers of deservedly high reputation, who advised the barriers of brush that were placed in the Yuba and the Bear. It was unfortunate that these barriers of brush did not have the advantage of a longer time in their construction, combined with the thoroughness of work by day's pay.

But there are more ways than one even of putting in barriers of brush. The Park Commissioners of the San Francisco peninsula restrain moving sands by vegetation. On the lower reaches of the Yuba where the overflow reaches a width of three or four miles, it would be possible and easy to make the stream level the sands; to plant and to make grow trees, shrubs and brush, notably the alders and willows. Then in October of each year to clip the growth back to a foot or two to wind the clippings among the stumps, and when the winter and spring floods came they would bring down the sands and slums lodging and burying them under the next summer the growth would spring up literally as thick as the hair on the back of a dog. This growth could be carried in a sweeping curve of a half mile wide or more down and from highland to highland. The highest water ever known on the Yuba would not cross a barrier of this kind one foot in depth. At ordinary stages, water could only be seen above and below. This growth would increase in height and strength from year to year, and in time the farmers below would consider themselves safe—much safer than they are now or have been heretofore. If once the farmers could see and know this there is no doubt but that arrangements could be made so that hydraulic mining could be resumed.

French Corral, Cal.

N. C. MILLER.

COSTLY WOOD.—It is said that \$15,000 were once paid by Messrs. Broadwood—the famous English piano makers—for three logs of mahogany from the same tree, each fifteen feet long and three feet and two inches square; that is something over \$33 per cubic foot. The attraction was the unusual beauty of the "hurl," which made it valuable for veneers.

MECHANICAL PROGRESS.

Rotary Engines.

Speaking of rotary engines, the London Engineer of recent date supplies some interesting matter, from which we collate the following:

Watt and his pupil Murdoch produced a number of practical methods, and, though none of their productions were capable of pushing aside the original pattern, each of these able mechanical engineers seemed to think that some kind of rotary engine would eventually be introduced and universally adopted. Hundreds of inventors since their time have devised and patented hundreds of engines, and among those who could not resist the attractiveness of the subject, but have not pursued it as far as the Patent Office, are some of our present foremost engineers. With such a vast number of rotary engines there is a great variety in the shapes and dispositions of the parts of which they are composed. Some of them have rectangular pistons, others have that part which corresponds to the piston in the shape of an eccentric cylinder. Circular pistons depending for their steam-tightness upon centrifugal force, pistons in the form of a sphere, sections of a sphere, inclined planes, have all been adapted. The chamber in which the piston works is shaped to correspond with the particular kind of piston used, and is further complicated by having to be formed so as to provide for the necessary steam and exhaust passages. In the most recent types of these peculiar engines no step toward lessened complication seems to have been made.

In the majority of cases this great fertility has not been attended with any useful result. Practical engineers were naturally curious to know what could be the reason that so much ingenuity and zeal should be so constantly foisted in the endeavor to solve a problem at the first sight of such easy solution. Many writers, taking experience for their guide, denounced the undertaking as impracticable, their chief point being that it was uniformly attended with too much complication of internal parts, which rendered it impossible to make a secure and durable joint.

In this spirit Bourne, in writing of rotary engines, speaks lightly of their originators, and alludes to their notions of the "imaginary imperfections of the direct acting engine." Another eminent writer denounces the engines as "useless machines that have been the means of wasting much capital and thought," and puts aside their designers gently, but firmly, as "would-be inventors that have been warned again and again." Such discouragement, coming from philosophers and engineers, is sufficient to cause any man of inventive ability to hesitate and leave the field of such invention. And such would have been the case had not a new want or quality appeared in connection with the rotary engine, and a new demand for that special attribute. This class of engine seems to have the property of running at great speeds at moderately small powers; and this action is exactly that required for generating electricity for lighting purposes. With this fresh object inventors have returned to the old problem with greater eagerness and hope than ever, and the result has been the production of wonderful specimens of ingenuity, among which are a number of engines of practical use for driving dynamos.

It is the general opinion that in a rotary engine, as the object desired is a more direct application of the steam in turning the shaft, they must therefore necessarily be of a simple construction. The ordinary reciprocating engine is looked upon as a circuitous way of arriving at the desired end, and although in rotary engines there is always a difficulty of keeping the many internal rubbing surfaces steam tight, it is supposed that this mere practical side of the question will be met when metallurgy gives us an unwearable material and engineering a perfect joint.

It is, however, an entire mistake to suppose that any engine worked by a pressed fluid, such as steam or compressed air, can be made, which can possibly work without a reciprocating movement; or that any reduction in the number of working parts takes place below that used in the simple cylinder engine without destroying its efficiency. Some time has elapsed since these facts were foreshadowed by engineers, and definitely enunciated by R.uleaux, and yet we find persons who are either unacquainted with them or disposed to disagree with them.

The chairman, at one of the meetings of the British Society of Arts, said it was a standing disgrace to mechanical science that it had to have recourse to a reciprocating movement when it wished to end with a rotary one. This opinion must have been hastily offered, for if the eminent speaker had considered closely any of the vast number of engines professing to produce rotary motion direct, and that which had been written upon this point, he would have seen that no fluid pressure engine exists which has not a reciprocating movement, either relative or absolute, and which has not, if complete, the same number of working parts in its composition as the much-despised ordinary cylinder engine. Even the inventors of rotary engines seem disposed in many cases to think they have done away with the reciprocating movement, and, however plainly the action occurs in their combination, they tacitly ignore it, as though it were something to be ashamed of.

Metallic Railroad Ties.

The railroads of this country pay \$6,000,000 a year for cross ties. The timber used is oak, chestnut and hemlock in the East, and oak, cherry, locust, maple and ash in the South and West. More than 225,000 acres of forest are needed to supply these ties every year, and consequently the necessities of railroads in this respect alone form a considerable item in the destruction of our forests.

Railroad ties need replacing every three years. In building a new road the estimate is 2700 ties for each mile. It is safe to say that it will require 300 ties per mile per year to keep a road in repair. From 12,000,000 to 15,000,000 new ties are required by the railroads of the United States every year. The annual clearing off of a million acres of timber to supply railroads with ties alone is something that should direct the attention of those who are interested in the important question of protection to forests to the finding of some practical substitute for wooden ties. Fame and fortune await the inventor who will discover such a substitute.

The only practical solution of this question is a resort to metallic ties. The value of steel railway ties under the different climates of the world and the diverging services required is not likely to long remain a mooted question or the sport of theory. They are being extensively put down in India. France is trying them, as is also England; a series of comprehensive tests to be made in New York, and the Dutch railways have just ordered some 70,000 sleepers for trial in that country. After the questions of durability and economy are determined will arise that of the best form for the tie, and scope will be given for a good deal of scientific invention. Concomitant with these will be the establishment of a new industry, the magnitude of which impresses itself upon the mind when the number of railroad ties in use and which are to be replaced is thought of, to say nothing of future expansions of the railway systems of the world. Such an industry would not only consume the surplus iron product, but would stimulate it. It would at the same time relieve the enormous drain on the world's timber resources and prove immensely advantageous in many incidental ways.

At a recent meeting in Paris of the French Society of Civil Engineers, a paper by M. Post, of Holland, upon metallic railroad ties was read. According to the author, the principal advantages inherent in the new system, advantages based on an actual trial of about twelve years in Germany, etc., were: 1. The average durability of the ties remaining in the track after twelve years' use is much greater with metallic ties of good design, than with the best wooden ties. 2. Safety is better guaranteed, as the gauge is better preserved. 3. The expense of maintenance is decreased after the second year of service, while with wooden ties this item increases with the age of the ties. 4. The system is rapidly perfecting, so that the fastenings are made absolutely certain, and less expensive for repair and maintenance than fastenings used with wooden ties. 5. The value of the metallic tie when worn out in service is much greater than the value of an old wooden tie. In summing up these advantages, and combining them with the actual cost of purchase, redemption, and interest, M. Post concludes that no country can exclusively use wood for this purpose with true economy; and he cites Holland as a proof of his assertion, where wood is still easily obtained, and iron is not too plentiful. He says all the Holland companies have adopted the metallic tie.

THE AXE is essentially an American tool. It was always a very clumsy affair, until the skill and accessories of the American hack-woodsmen called for an improvement of the old European tool which was first introduced on this continent. Its form and construction has been made a most careful study, both in theory and practice. There is perhaps no hand-tool in use which has been more improved than the axe. In its study the laws of inertia, of falling bodies and the force of gravitation have all been carefully considered. Experience has proven that the length of handle and weight of iron must be duly proportioned to the stature of the man who is to wield it. Any variations from the proper proportions of man and axe involve a most important result in the amount of work which can be done in a given time. The inventor is not yet done with this useful implement. It is claimed that an axe which can be easier driven and more quickly withdrawn than those of the ordinary construction has recently been patented by W. C. Kelly, of Louisville, Ky. The blade is practically of uniform thickness at that point usually consumed by wear and in grinding. From a central point in the line of juncture between blade and head a bevel or taper extends toward the back and front edges of the blade. The line of taper radiates from its starting point outwardly on both sides and meets the edges at the point of juncture with the cutting edge of the blade. In addition to its increased usefulness the axe is claimed to present a keen and desirable appearance.

FORGING BRASS.—A correspondent of the Scientific American asks: "Can brass be worked in a drop at all? That is, can it be drop-forged the same as iron can?" The journal mentioned replies that soft brass can be worked very well in a deep press, but not to the same extent as hot iron or steel.

SCIENTIFIC PROGRESS.

The Theory of Acids.

All those substances which impress the organs of taste with a sharp, sour and cooling sensation, are in common language denominated acid. Both nature and art present us with many of these bodies, a few of which possess this characteristic in so faint a degree as to be scarcely perceptible, while others are so strongly corrosive as to require large dilution with water, before they can be safely applied to the living animal organs. From the power which acids have of combining with and dissolving almost all bodies, they are of first rate importance and very extensive application to various processes in the arts and sciences; hence they very early engaged the attention of chemists, and have to the present time been the subjects of more experiments than perhaps any other substances.

Acids, according to the corpuscular theory, which explained all chemical phenomena by the mechanical action of the ultimate particles of bodies, were considered as a genus of salts composed of minute and sharp spicula, which readily penetrated into the minute pores of the substances exposed to their action, and thus separated their component parts from each other, while at the same time the acid became neutralized by having its points sheathed in the pores of the body with which it was mixed. This weakness, however, of this theory was demonstrated by Boyle, and by Stahl in his work on salts; and the solvent power of acids was reduced by Macquer, and his contemporaries to the general laws of chemical affinity.

A striking fault of the ancient chemists was their disposition to systematize and draw general conclusions from a few and incorrect experiments; hence they supposed that all combustible bodies were indebted for their common properties to the presence of a combustible element, called by them phlogiston or sulphur. In all the species of metals they recognized a common metallic principle, under the name of unscrupulous earth; so also they imagined there existed a universal saline element or principle of acidity common to all acids. Becher affirmed this acid principle to be composed of water and earth, and therefore not entitled to rank as an element. Stahl was induced to believe that the sulphuric acid was the original one, of which all the rest were only modifications.

The discovery of oxygen gas in 1774, by Dr. Priestly, offered a new and most important substance to chemical investigation, which at length led to an entire change in the theory of the formation of acids. The illustrious Lavoisier, in 1778, presented to the Royal Academy of Sciences at Paris, a memoir on the acid of sugar, in which, after describing the method of preparing this acid from sugar and nitric acid, he concludes that the conversion of the nitric acid into nitrous gas is occasioned by the loss of a portion of oxygen, abstracted from it by the superior affinity of the sugar, which last, in consequence of its combination with oxygen, acquires the characteristics of an acid. The same able chemist discovered soon after, that phosphorus, sulphur and charcoal when inflamed in oxygen gas, combine with the base of this air, acquire an additional weight, equal to that of the gas which disappears, and are severally converted into the phosphoric, sulphuric and carbonic acids. Induced by these facts, he proceeded to generalize the inferences drawn from them, and maintained that the base of oxygen gas was the universal acidifying principle, which by combining with simple or compound combustibles, produced the various species of acids. This explanation has been generally acquiesced in though some objections to it have been brought forward, founded upon the analysis of prussic acid, which appears to consist solely of hydrogen, carbon and azote. The claim, however, of this substance to the character of an acid is very equivocal, as it neither tastes sour, nor alters vegetable colors. With equal or even superior propriety might sulphuretted hydrogen be placed in the list.

Although every combustible body is capable of uniting with oxygen, it is not necessarily an acidifiable base. It is supposed that some bases may be acidified in their several degrees, preserving in each distinct specific characters; hence results an important arrangement of these bodies as they are acidified in the first, second or third degree. The reformed chemical nomenclature has ingeniously distinguished these states by the terminations *ous* and *ic*, and the prefix *oxy* (for oxygenated). Thus, sulphur, at the lowest state of oxygenation at which it acquires acid properties, is called sulphurous acid; when still further oxygenated, it becomes sulphuric acid.—Exchange.

NEW PRODUCT FOR PETROLEUM.—An entirely new product, obtained by the distillation of petroleum, has been perfected by Dr. F. Salathe, of Titusville, which he calls the Oriental potato bog powder. It is non-poisonous, harmless to men or animals, but the most destructive agent to insect life ever discovered.

A VALUABLE MINERAL.—It is recorded that dechenite, or vanadate of lead and zinc, has been discovered in a mine at Helena, M. T. This metal is said to be worth \$22 per gram, or about \$10,000 a pound. A sample has been sent to San Francisco for analysis.

Astronomical.

The heavens just at this time are adorned with three unusually bright stars—Jupiter, Venus and Saturn. The former is the morning star, and those who rise up just before the breaking of dawn will find him a most superb object in the morning sky. He is still approaching the earth, and astronomers are again studying with great earnestness the famous red spot, which, it was reported a short time since, was probably fading out, and would soon disappear. Such is not the case. It is now much more distinctly seen than it was six months ago, though not so dark as the equatorial belt, nor nearly so conspicuous as it was five or six years ago. It is now quite distinctly outlined. This marking has now been observed for seven years, and its present aspect seems to foretell that its existence will be indefinitely prolonged. It may therefore be regarded as a feature of singular permanency. The prospect is that during the coming opposition the red spot will attract general observation. Astronomers have always the excitement that something unexpected may reward their patient work. It is not impossible that during the present year light may dawn upon the meaning of the mysterious red spot, so long an unsolved problem. Amateur observers sometimes find prizes where scientists fail; astronomical triumphs are gained by those who have not yet won their laurels.

Saturn also holds a prominent place in the heavens, and is almost bright enough to dispute the starry sovereignty with his rival, Venus, who holds her court low in the west. Saturn is still in a favorable position for the examination of his rings.

THE RED SKIES are yet, at times, quite prominent in the west. Mr. I. P. Noyes, of Washington, D. C., furnishes a theory concerning the mysterious pink and rose-colored skies, which is by far the most satisfactory of any yet introduced. He declares that these red tints proceed from certain conditions of the atmosphere, and may be just as readily foretold by arbitrary signs as a local storm or a tornado. According to his views, they are simply caused by the combination of a south "high" (barometer) and a north "low." At "high" we have the minimum of moisture, the delicate suspended vapor, which, in conjunction with the necessary amount of heat furnished by a north "low," will always produce the beautiful phenomenon of red or pink skies. Mr. Noyes suggests that anyone who wishes to test the value of this explanation can easily do so by consulting the weather map and familiarizing themselves with the exact atmospheric conditions under which these effects are almost always produced. The cause of their occasional absence under these circumstances is simply due to the fact that the sky is not always clear, even with a "high." The theory is certainly preferable to any offered heretofore, and is probably a correct elucidation of the beautiful rose-colored mystery.

A THEORY OF THUNDERSTORMS.—C. Lieben.—Observations which the author has made by means of small balloons of a very small power of ascending, make it appear probable that thunderstorms are occasioned by ascending, atmospheric currents. Such a mass of air saturated with moisture expands on ascending, and is simultaneously refrigerated. A portion of its watery vapor is therefore condensed, and the latent heat thus set at liberty accelerates the upward movement. The precipitated drops of water are at first very small, and present therefore in their totality a large surface. They are therefore, in the first place, carried along by the particles of air impinging on their lower surfaces. On further condensation they increase in bulk, and fall down through the ascending currents of air towards the earth. Thus, as in Armstrong's steam-electric machine, a powerful friction is set up between the watery vapor of the ascending air and the falling drops. Hence the watery vapor becomes positively electrified, whilst the drops take a negative charge. The author explains the almost invariably positive condition of the atmosphere by the continued friction of the water dissolved in the air against the moist surface of the earth, the surface of the sea, and especially the drops of rain.

BEAUXITE is a valuable mineral for the beds of furnaces and for the manufacture of aluminum; the best comes from Beaux, in the south of France; another variety is found near Belfast, and is largely used in the north of England. Cryolite is used as a flux for the beauxite in the manufacture of aluminum. At one time the cryolite itself was used as the source of that metal. Beaumite consists chiefly of alumina and iron, with a little tartaric acid; the white variety contains 21 per cent of silica. Sometimes beauxite contains enough iron to be regarded as an iron ore. Cryolite, which means "ice stone," is plentiful in Greenland. Its composition is: aluminum, 13; soda, 32.8; fluorine, 54.2. It is fusible in the flame of a candle, giving off some of its fluorine, which is at once transformed into hydrofluoric acid by the moisture in the air.

COAL PRODUCT.—One fifth of all the coal produced in the United States is found in four counties, of which Pittsburgh is the business center. Nearly one-third of the product is converted into coke. There are 100 coke makers, 12,000 ovens, and \$13,000,000 invested. Six thousand men are employed.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Amador Ledger, Jan. 16: Operations at the Mahoney mine have been somewhat delayed on account of the necessity of having two new skips made. They were commenced over a week ago, and will be completed some time next week. They will be 2½ feet across, 10 feet deep, with a capacity of 500 gallons. As soon as the 500-foot level is reached the pumps can be connected, and with pumps and buckets combined the water can be very rapidly taken out. If no serious mishaps occur it is expected to have the mine drained inside of a month after reaching the 500-foot level. It has been decided not to crush any more surface rock, as the ore is so soft that it is difficult to manage in such a heavy mill. A clean-up was made at the Lincoln mill last week, and Mr. Stewart is paying off this week, putting considerable coin in circulation. At the Eureka tunneling in the direction of the old works is to be commenced right away. It is the intention, I believe, to keep a drill hole some distance ahead of the tunnel as the operations approach the old works, which, of course, are full of water. This is a necessary precautionary measure to guard against accident. Messrs. Valentine, Harrington and G. W. Horn took a trip to the head of Lincoln ditch this week. It was found that for lack of attention the capacity of the ditch has been impaired to such an extent that it will have to be enlarged before a sufficient supply of water can be had to run the pumps and mill.

KENNEDY.—Amador Sentinel, Jan. 16: Water is now being raised out of the Kennedy mine in earnest, a bucket holding 530 gallons being constantly on the jump, run by one of Knight's water wheels.

Calaveras.

WEST POINT.—Cor. Calaveras Chronicle, Jan. 16: After diligent inquiry we managed to ascertain that the Keltz mine, situated about 2½ miles in an easterly course from West Point, on the south side of the north fork of the Mokelumne river is now under process of development, under the able management of a gentleman named Peasley. The mine has, in former years, turned out considerable gold, and it only remains to be determined whether the supply has been exhausted or not. Mr. Richardson, of the Star of the West, will resume operations at an early day. We believe parties are now making preparations to commence work on the Water Lily, a mine that has been idle for some time, and formerly known as the French Lead, and is now the property of Mr. J. Gouldson, a young gentleman of some official distinction. The Russell reduction works remain in statu quo. The Valentine mine, on Valentine hill, about one mile east of West Point, has been working for a few days, and Mr. Charles George feels very much elated over the present prospects of the mine, the vein in the bottom of the shaft being quite large and containing gold in the proportion of \$75 to the ton, if not more. Geo. Simpson & Co.'s reduction works, we understand, have collapsed; cause, no dividends; effect, shut down. Whether operations will ever be again resumed, we are unable to say. The Wood House, one of the most promising mines in Sandy Gulch district, and in the same mineral belt as the West Point district, promises fair to become a very valuable property. Negotiations on the Lone Star seem to have dropped through, or at least there is nothing more said about it. All the other stars of this mineral constellation are now idle, and their respective owners are merely "waiting for the turn of the tide."

Inyo.

LEAD CANYON ORE.—Independent, Jan. 16: Last Monday return was had from the recent experimental shipment of ore from Lead canyon, and the result exceeded expectations. There were three different lots of the ore. The first lot or 4726 pounds went 82.35 ounces of silver per ton, and 58 per cent lead. Total value per ton \$117.81. Second lot, 5293 pounds, silver, 72.58 ounces and 58½ per cent lead. Total value \$109.27 per ton. Third lot, 651 pounds, silver, 49.97 ounces and lead 64½ per cent. Total value \$93.06 per ton. This result is so satisfactory that work on the mines will soon be extended and pushed vigorously. A new road across the Inyo mountains, across the Mazurka canyon will be one of the first jobs undertaken. There is every indication of a big camp at Lead canyon.

Nevada.

RELOCATED.—Foothill Tidings, Jan. 14: The Old Kentucky Ridge mine, which had some work done upon it some years ago, has recently been relocated by parties of Grass Valley, and they intend soon to begin work upon the property. All of the surrounding gulches in the vicinity of the Kentucky Ridge have been very rich in coarse gold, and those gulches or ravines must have been fed from some quartz vein. The relocators think they know where the vein is.

IT IS A SALE.—Pioche Record, Jan. 12: We learn from a very reliable source, that the Monitor Mining Company of Taylor has been sold to an English Company, and the price to be paid is in the neighborhood of \$100,000. This amount is to be paid in coin in full—no stock. The property has not changed hands yet, owing to a flaw existing to the title of some of the property. As soon as this is remedied the property will be turned over to its new owners.

Mariposa.

PLACER MINING.—Mariposa Gazette, Jan. 16: We learn from our traveling agent, Joseph Lind, who has just made a run over on Whitlocks, Sherlocks and Colorado and Mono that there are quite a number of placer miners who have taken advantage of the late rains and are washing out gold in greater or lesser quantities, and that all, so far as he could see, were doing well. As an indication of their prosperity, he says, they were all in fine spirits and several of them took special pains to show him the gold in the bottoms of their sluices, sufficient to incite the miner to contribute liberally his strength applied to the pick and shovel with a buoyant hope and a feeling of certainly being rewarded for their

toil and most arduous labor, for some of their claims are among the rocks and boulders which require the use of derricks to remove, underneath of which is usually found the dry dirt containing the precious metal. Among them he saw John C. Felger, commonly known as Dutch John, and Leonard Heinold, who have a claim and are mining on Sherlocks creek just below the falls. They have a string of sluices and a derrick, and, as Dutch John says, they are just making Rome howl when they have water. Charlie Frank, who has a family and a ranch, is mining in his field. The O'Gorman mine and mill on Saxton's creek, known as the "Buena Vista mine," now belonging to Dr. Turner, of Mariposa, is undergoing repairs and being renovated generally. There are six or seven men employed in and about the mill, the main shaft of the mine having been cleaned out and ready for use. Bess Cochran is running an arrastra, grinding quartz on Sherlocks. He has a small vein of quartz which he says yields \$30 a ton. Sam'l Huston and C. V. Dingley have a good placer claim over on Mono. They have at present a good sluice stream of water.

Mono.

BENTON COR.—Inyo Register, January 16th: The Little Emily M. & M. Co.'s mill at Montgomery has shut down, owing to the heavy frost, after a steady run of eight months. W. H. Russell, Superintendent, shipped two large bars of bullion on the 7th. The mill will start up again as soon as the weather is favorable, with plenty of ore on hand.

A number of the miners on Blind Springs Hill have been taking out small lots of ore lately, and prospects are looking very well for 1886.

Shasta.

PLACER AND QUARTZ.—Shasta Democrat, Jan. 13: More machinery arrived from Iron Mountain the past week. Several of the railroad boys have caught the Squaw creek mining fever. Clark & Co.'s mill will be running again next Monday under the superintendency of Mr. J. O. Stewart. Deputy U. S. Mineral Surveyor Graves is up on Squaw creek surveying mining claims for Jack Conant and others. A New River miner struck a fine prospect on the river opposite Middle creek last week. The vein is about four feet wide and shows "noodles" of free gold. Andy Fife has put the Lower Springs mill in operation and it is doing splendid work. John Finley is taking out some fine rock on the Weiser place, which he will have crushed in this mill. Lou Gross and Ned Dix have discovered an old abandoned "pocket" claim in Star gulch which exhibits evidence of worth, and they intend to "see what's in it." In the pitmy days placers were not half worked, and perhaps this was similarly treated, and may still continue a little "snuglet." The engine and boiler for Stocks, Whitton & Co.'s mill on Squaw creek will be shipped the latter part of this week and the rest of the machinery in about ten days. The company has a full force of men at work getting out timbers and excavating ground for the milling machinery, and if fair weather prevails the mill will be crushing rock within 60 days. Simonds & Barnes last week made three more locations on the limestone belt on Squaw creek, from which fair prospects are obtained. This makes seven claims in a bunch, the ore of which, according to the opinion of miners familiar with that class of rock, is identically the same as that of Iron Mountain and the Balaklalla. At any rate, assays from these claims run from \$5 in gold up to \$165, which is indeed very encouraging surface prospects.

NEVADA.

Washoe District.

GOULD AND CURRY.—Virginia Enterprise, Jan. 16: All exploration in this mine and its adjoining coadjutors on both the 1000 and 600 levels heretofore being conducted are discontinued for the present, and work concentrated on the opening of the Osbiston shaft for deeper explorations in both mines, to be conducted to a depth corresponding with the 3200 level of the Combination shaft and the Savage, Hale and Norcross and Chollar on the south. The machinery at the Osbiston shaft will be started into operation to-morrow after a rest of over a year. The shaft has then to be put in good order and repair, when the pumps will be started up to take out the 700 feet of water in the shaft and drain the lower levels, after which sinking deeper will be in order, having to go less than 1200 feet in order to attain the required depth. The Bonner shaft of the Gould and Curry Co. is 1500 feet deep, with an incline from it 200 feet deeper, carrying it to the level of the Sutor tunnel, with which it connects by drift. Air pipes have been put down through the Bonner shaft and carried through in continuous line to the Osbiston shaft on the Sutor tunnel level to supply the necessary air at that depth, until other arrangements can be made at the Osbiston shaft for a more direct air supply.

HALE AND NORCROSS.—The bulkhead on the 2800 level, to stop the strong flow of water from that point will be completed in a day or two. This will shut off some 15 inches of water, or about 250,000 gallons per day, which the hydraulic pump in the Combination shaft heretofore had to handle. The deep winze from the 3000 level is being sunk deeper, and was, last evening, 37 feet below the 3100 level. Its bottom or face is in dry vein matter, carrying good streaks and bunches of ore showing that there is no miscalculation as to the ore body extending below the 3100 level. All indications go to show that the ore makes to the north and the east and will be found concentrated near or north of the Savage south line. This point will, however, be soon developed by the sinking of the shaft and drifts therefrom.

CHOLLAR.—All work now being concentrated in the sinking of the Combination shaft, nothing is being done in the mine. The progress of sinking has been somewhat delayed during the past week, owing to cutting out a station for and putting in a tank just below the 3100 level, to catch up the drainage from that level and above, thus obviating the necessity of pumping it from a lower depth. The Cornish pump will be lowered the coming week to take the water from that point. The water supply driving the big hydraulic pump has been somewhat deficient, owing to heavy freezing weather in the mountains, leakage of flumes, etc., but this difficulty is obviated and the pump operating with full force and effect as before.

OPHIR.—The explorations on the 400 level of the Mexican shaft show no new features of interest to mention, and the same may be said of the new work on the 700 level, consisting of a joint drift, being run

to the northwest from the Ophir shaft, together with the Mexican and Union Companies, which is now 117 feet in length, in vein matter all the way. On the 300 level is a station, being cut out in the Mexican shaft, is nearly or quite completed for a drift west in Ophir ground. This is intended to cut the good ore body known to exist at that level instead of upraising from the 400 level, as heretofore proposed.

CON. CALIFORNIA AND VIRGINIA.—About 300 tons per day is the average product of this mine at present, principally from the 1750 level and the Jones contract section above. The average assays from the Morgan and Eureka mill batteries during the past week were about \$16 per ton. The drift being run to the northwest on the 1650 level is now in 455 feet, and in about three weeks longer will reach the old ore stopes in that direction. On the 1400 level, at the C. and C. shaft, a station is being opened and a drift started north for the same purpose. Bullion valued at \$29,000 was shipped last week.

SIERRA NEVADA.—The joint Mexican and Union drift on the 700 level running northwest is now in 117 feet and making good progress toward the ore section known to exist in that direction. On the 500 level the east crosscut has been advanced to the distance of about 500 feet, and its face should be near the eastern boundary of the lode. The material encountered is still vein porphyry, with occasional streaks of decomposed porphyry and clay.

YELLOW JACKET.—Owing to the cold snap prevailing, freezing the motive power of the Brunswick mill and reducing the ore-crushing capacity, the production from the mine fell off somewhat. The old stopes and breasts in the mine, however, are looking as well as usual, and capable of giving the mill all it can or will take.

MEXICAN.—On the 700 level the joint Mexican and Union drift running northwest was extended 42 feet, making a total length of 117 feet. On the 500 level the north lateral drift from the east crosscut is now in 332 feet, with its face in vein porphyry carrying streaks of quartz and clay.

KENTUCK.—The usual amount of ore continues to come from the old upper levels. As stated in yesterday's Enterprise, Hon. C. Stevenson has resigned from the superintending management of this mine, and nothing definite is stated as to who will be his successor.

CROWN POINT.—There has been something of a falling off in the ore production, owing to the motive power of the mills on Carson river freezing up. Meanwhile exploration and development work goes steadily ahead as usual.

UNION CONSOLIDATED.—On the 520 level the main north lateral drift has been extended 42 feet, making a total length of 1505 feet. The face shows no change in material being a hard, dry vein porphyry formation.

ALTA.—The lateral drift north on the 700 level is progressing steadily ahead, as usual, in good working ground.

Bernice District.

ORE SHIPMENTS.—Sentinel, Jan. 16: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond works—Scorpion mine, 3 tons; Wide West, 3; Silver Nugget, 6; Albion, 18, and Continental, 1. To the Eureka Con. works—Dunderberg mine, 32 tons; Reveille, 2½; Morey, 5½.

Esmeralda District.

AT WORK AT AURORA.—Cor. Bodie Free Press, Jan. 16: Answering the prayers of all, and especially gratifying the aspirations of those of the laboring class, who were previously promised employment by the Con. Esmeralda Co., the mandate went forth on the 8th inst., to be on with the boom. Accordingly a few men were set to work in different localities, under the management of mechanical engineer C. E. Ryan and foreman Harry Newton. Since then the number has been steadily increased until it now approximates forty. It was observable to-day that in so short a time a marked change had taken place in the aspect of affairs. At the Humboldt Con., a blacksmith shop and a temporary structure for sheltering windlass men, have been erected, and the hoisting engine and boiler used by the Real Del Monte mining company have been uprooted from the old foundations and removed to the perpendicular shaft, 100 feet in depth and being made a double compartment, near which new foundations have been outlined and their construction begun. A blacksmith shop also has been built at the middle hill tunnel in which a car track is being so rapidly laid that within two weeks it is safe to say it shall have been cleared of the gathered debris and miners will be working in its face about 700 feet from its entrance. General repairs are being made at the Humboldt mill, which is being slightly remodeled for the initiation of a milling process somewhat similar to the one employed by the Noonday Company, in Bodie.

Sacramento District.

NAMING MINES.—Silver State, Jan. 16: There is considerable prospecting carried on in Sacramento District, southeast from Rye Patch, and new leads are being discovered and abandoned claims relocated. One of the new leads has been named "Senator Beck," in honor of the great Kentucky champion, while another lead has been called "Senator Evans."

Pennsylvania District.

THE MILL.—Pioche Record, Jan. 12: There are now fifteen men to work on the mill being erected in this district by G. R. Barton. The last load of the machinery was expected to be unloaded there the last of this week. A two-story boarding house has been erected, with a roof so steep that it looks like a church, and on entering it the men doff their hats, bow low their heads and wear a very humble appearance, and when administered, before meals, a dose of medicine for the purpose of driving away the chills, they praise Him from whom all blessings flow. The mines of the district continue looking well. Everything gives promise of the enterprise yielding substantial benefit to its projectors.

ARIZONA.

LEASED.—Prescott Courier, Jan. 16: We are glad to learn that a lease of the old Senator mine has been taken by Ex-Gov. Tittle and Mr. Frink. The workings are full of water, and many of the drifts have caved in. It has been under consideration to run a 1500-foot drift from the bottom of the hill to

cut the vein at about 700 feet depth. This, though extensive, would drain the mine, and develop a larger ore body than the shaft now reaches. Col. Bigelow and his associates are at work on the Davis mine on Slate creek. They have a considerable amount of ore on the dump, which will go to the Sterling mill for treatment. A large lead of gold-bearing quartz has recently been discovered, two miles west of Walnut Grove. The average is about six dollars per ton. The "110" mine, near Wolf creek, on which a hundred foot shaft and drift was sunk and run by E. M. Clark in 1884, and then abandoned, is now in the hands of lessees who have recently struck a fine body of ore. They are now arranging for having it hauled and worked at the Sterling mill. The extension of the "110" has been taken up by Mr. Hughes, who is engaged with Mr. Cartnell in working the tailings of the old Aztlan mill. The mill has been put in good working order by Mr. Cartnell, who has made a very successful run of the tailings. The stamps will shortly be put to work on rock from Mr. Hughes' recent acquisition. The Messrs. Mahoney are putting up a 30-foot water wheel on their drain, 10 miles down the great canyon of the Hassayampa. They have two valuable gold properties there, one a large ledge of low-grade ore, the other comparatively small, but running high. They propose working ore from the latter in arrastras driven by the wheel, for which they have a good fall and plenty of water. Mr. William Morgan, who owns in the Pine Spring, Victoria and other mines in Turkey creek district, is in Prescott. He gave us to understand that work on the Pine Spring and a great many more claims is progressing favorably. Billy Gavin is sacking very rich silver ore. The Sterling mill will start on another run this morning. Groom creek district, six miles south of Prescott has a good metallic future before it. Its ledges of gold and silver have been pretty thoroughly tested, and some of them are now being worked in good shape.

COLORADO.

HYDRAULICKING.—Grass Valley Union, Jan. 16: W. J. Madden, who was in town yesterday, informed us that about the first of February he will leave San Francisco for the San Juan country, in Colorado, where he goes to take charge of a hydraulic mining property belonging to a Salt Lake company. He goes under engagement for one year and under a liberal salary. Under instructions of the company he has purchased \$1000 worth of hydraulic mining machinery at Marysville, which is to be immediately forwarded to Colorado. The company owns 800 acres of gold-bearing gravel land from 30 to 50 feet in depth, and are now constructing a canal to bring water upon it. Mr. Madden expects to get to work with monitors about the first of April. The company could have made no better selection of a superintendent, as Mr. Madden has had long and valuable experience in hydraulic mining. He has also mining interests of his own in Colorado, from which he expects to realize handsomely.

IDAHO.

ORE.—Ketchum Keystone, Jan. 16: G. McPeters is hauling ore regularly from the Elkhorn to the smelters. The old Elkhorn isn't quite played out yet. The present shipment consists of 100 tons of second-class ore. Wm. Schultz was down from his Boulder mines the first of the week. He has struck rich ore in the Belcher mine. A ten-inch vein with a six-inch ore body of high grade has been found, which grows larger as opened up. Mr. Schultz is much elated over his "find" and predicts developing the Belcher into a second Ophir. Wm. Schultz and Harry Murdock are the lucky owners of the Belcher.

NEW MEXICO.

MILL.—Albuquerque Journal, Jan. 14: Scorro mountain miners can no longer say that they cannot afford to work their properties for want of reduction works to treat the output. The Merritt mill is in full and successful operation, and is prepared to reduce all ore that may be forwarded to the works.

OREGON.

BUSY.—Jacksonville Times, Jan. 16: Miners are busy again, and most of them have considerable water, notwithstanding the late cold weather interfered with the supply. The change in the weather is appreciated by the miner more than anyone else, as the cold snap interfered with mining operations for several days. As much mining has already been done this season as last, and winter has not more than begun; we consequently predict that the miners will do well this time. A portion of the timber for the quartz mill in this place have been sawed out by Parks & Son of the Sterling and hauled here. The machinery will be put in position before long. The mining interests of Wagner creek are developing so rapidly that the O. & C. R. Co. talks seriously of putting in a switch at Talent to facilitate the shipment of ore. Many prospectors are in that region.

UTAH.

STRIKES AT STAR.—Cor. Salt Lake Tribune, Jan. 16: A rich strike occurred last Saturday in the Midas mine in one of the leased shafts. The lucky men are P. T. Cook, Remington and Matherson. The ore body is over two feet wide and assays way up in the hundreds. All the claims in North Star are looking well and lots of ore are being extracted. The new incorporators are putting in shape their sampling mill here to buy ores. This will be a big help to the miners hereabouts. A body of fine quartz has been struck in the New Hope mine in the foothills of Star district, that assays 12 per cent lead, \$33.16 in gold, and 12 ounces of silver per ton. It is one of the best defined ledges in Star district, and has one shaft down 145 feet. It is owned by Judge Boreman and B. A. Spear. From this mine a belt of quartz carries gold in spots as high as \$1000 per ton, i. e., in the Cortez and Esmeralda. Also in the Day Dawn and the Onida Guard. The half of Star district is not known, for every day some new development opens the eyes of the old miners here, and prompts them to exert themselves anew, and in new places on their several claims. The outlook for Star, Lincoln, Beaver Lake and Bradshaw districts is very encouraging.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING JANUARY 5, 1886.

- 333,713.—ELEVATOR—H. Albert, Crescent City.
 333,754.—GAS REGULATOR—M. J. Amick, Portland, Or.
 333,715.—FRUIT JAR—D. E. Ashby, S. F.
 333,716.—FRUIT JAR—D. E. Ashby, S. F.
 333,717.—FRUIT JAR—D. E. Ashby, S. F.
 333,611.—ORCHARD GUARD—J. B. Daveggio, Paicines, Cal.
 333,507.—COMPOUND ENGINE—W. H. Donaldson, S. F.
 333,625.—DISTANCE INSTRUMENT—Hansard & Tribbey, Oroville, Cal.
 333,755.—MOLDING CONCRETE TUBES FOR CABLE RAILROADS—J. D. Isaacs, Oakland, Cal.
 333,761.—KNIFE CLEANER—L. Lawson, Butte, M. T.
 333,642.—NECKTIE FASTENER—L. Lemos, S. F.
 333,674.—CAR BRAKE—W. H. Masterman, Newark, Cal.
 333,533.—HARVESTER—D. C. Mattison, Stockton, Cal.
 333,773.—DEVICE FOR ROLLING LEATHER—Geo. Middlemas, S. F.
 333,660.—BALING PRESS—T. C. Naramore, Los Angeles, Cal.
 333,883.—COMPOUND FOR PREVENTING RUST—J. F. Nolan, S. F.
 333,958.—LIFTING JACK—E. Nordyke, Heppner, Or.
 333,682.—SQUARE HOLE AUGER—W. Patterson, S. F.
 333,675.—ENGINE OR PUMP—W. C. Salmon, Portland, Or.
 333,676.—FLY TRAP—Benj. Sanford, Smartsville, Cal.
 333,552.—BOMB LANCE—A. Schneider, S. F.
 333,679.—CLASP—A. Schurch, S. F.
 333,555.—ALTITUDE INSTRUMENT—B. B. Sharp, S. F.
 333,562.—SAW TABLE GAUGE—D. W. Standford, Oakland, Cal.
 333,792.—STOP WATCH—John Tixier, S. F.
 333,904.—MACHINE FOR MAKING SCREW THREADS ON PIPE JOINTS—F. F. Voigt, Walla Walla, W. T.
 FOR WEEK ENDING JANUARY 12, 1886.

- 334,211.—PUMP—H. M. Baboon, S. F.
 344,108.—STEAM ACTUATED VALVE—W. M. Cary, S. F.
 334,110.—SPRAY NOZZLE—E. J. Delaney, San Jose, Cal.
 334,384.—AUTOMATIC BRAKE—J. T. Honeycutt, Vancouver, W. T.
 334,120.—ICE MACHINE—A. R. Kenney, S. F.
 334,024.—THRASHER FEED REGULATOR—A. W. Lockhart, Stockton, Cal.
 334,125.—PAVEMENT JOINT MARKER—M. McDonald, Oakland, Cal.
 334,270.—REFLECTOR—J. E. McLaughlin, Portland, Or.
 334,130.—APPLE PARSER, ETC.—W. W. McMillan, Hurlon, Cal.
 334,131.—CALF WEANER—H. W. McNeal, Ferndale, Cal.
 334,028.—SALVE—A. Meyer, Empire City, Nev.
 333,393.—SAW TEETH—Swank & Dages, Big Trees, Cal.
 334,096.—ANIMAL TRAP—G. F. Voester, Pomona, Cal.
 334,317.—ELECTRIC LAMP—F. G. Waterhouse, Sacramento, Cal.
 334,149.—GRADING LEVEL—C. Willganz, Little Stony, Cal.
 NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co. in the shortest time possible (by telegraph or otherwise) at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FRUIT JAR.—D. E. Ashby, S. F., No. 333,715. Dated Jan. 5, 1886. This invention has for its object the hermetically sealing of canned fruits and vegetables, and it consists of a combination of devices.

CLASP.—Albert Schurch, S. F., assignor of one-half to S. Stemmer. No. 333,679. Dated Jan. 5, 1886. This invention relates to an improved fastening for gloves, shoes or garments, and it consists of a two-part clasp, one portion of which is secured to the meeting sides or edges, and the other to the opposite side, the meeting ends of these parts being so controlled as to interlock when brought together.

STOP WATCH.—J. Tixier, S. F., No. 333,792. Dated Jan. 5, 1886. The invention relates to certain improvements in stop watches; and it consists of a mechanism by which an independent band may be started or stopped at any point in its circuit and returned to the original starting point, this mechanism being so constructed and arranged that the inventor is enabled to dispense with a number of the wheels and springs, which are ordinarily used in this class of mechanism.

APPARATUS FOR ROLLING LEATHER.—George Middlemas, S. F., No. 333,773. Dated January 5, 1886. The device is for rolling leather or packing it closely for storage or transportation. It consists of a roller around which the leather is to be turned, guides in which pins or trunnions at the ends of the roller traverse, and an adjustable weighted or spring mechanism in connection with these guides which allows the roller and its spindles to adjust themselves to the increasing diameter of the roll. It also

consists of belts or bands and the means for operating them whereby the roll is advanced, and in harvesters details of construction.

HARVESTER.—Don C. Matteson, Stockton. No. 333,533. Dated Jan. 5, 1886. The invention relates to certain improvements in harvesters, and to this class in which the heading, threshing and separating and cleaning mechanism are united together by a frame or frames, so that they may be propelled about the field to cut, thresh and clean the grain as they go; and it consists of a header frame adjustably connected with a secondary frame, which in turn is hinged to this side of the threshing, and in certain improvements of the mechanism for raising and lowering the header, and in certain details of construction.

COMPOSITION FOR PREVENTING AND REMOVING RUST.—John F. Nolan, S. F., No. 333,883. Dated January 5, 1886. This is a peculiar composition for preventing the rusting of metal surfaces. It is specially adapted for cutlery and firearms. In using shotguns where there is dampness, as on the marshes, it is very difficult to keep them from rusting. When they get heated, in use, they rust rapidly. To prevent this, the metallic surfaces is first dried and then rubbed with this composition, which is applied by means of a soft cloth. On a surface which has no rust, it will prevent oxidation taking place; and on a surface which has a slight coating of rust, it will remove it.

FRUIT JAR.—Delmar E. Ashby, S. F., No. 333,717. Dated Jan. 5, 1886. This patent differs from the former one allowed to the same inventor July 17, 1885, from the fact that in the former case the rubber packing extended down the side of the jar into the grooves or channel around the upper part of the jar; but in the present invention a ledge with an interior groove is formed upon the top of the jar, upon which the rubber ring is placed, and is compressed upon this upper edge without extending downward along the side of the jar. The center of the cap may have the usual opening and supplemental cap for the introduction of the fruit, and this may be removed or replaced without in any way interfering with the exterior flanged cap and joint.

FRUIT JAR.—Delmar E. Ashby, S. F., No. 333,716. Dated Jan. 5, 1886. This invention has for its object the hermetical sealing of canned fruits, vegetables and other goods. The jar has a groove upon its side and a lip projecting upwardly around the inner periphery of the top, so as to form an exterior ledge in combination with a rubber or elastic ring fitting said ledge; a ring surrounding the upper edge of the jar, having its lower edge turned into the groove or channel, and a cap so formed as to press the rubber upon the ledge and having a downwardly-projecting rim or flange engaging by a folded point a corresponding flange in the annular ring, whereby the two are united and secured.

ELEVATOR.—Henry Albert, Crescent City, Del Norte Co., Cal. No. 333,713. Dated January 5, 1885. The invention relates to the class of elevators and to those appliances or connections by which the cage is caught and held in case the rope breaks. The invention consists in peculiar racks in the elevator shafts, anti-friction guide wheels in the cage, sliding bolts on said wheels, and mechanism dependent upon and operated by the central spring-actuated spindle, to which the lifting strain is applied for projecting and retracting the bolts to cause them to engage with or be disengaged from the racks. It consists, further, in various details of construction and in a peculiar buffer at the bottom of the cage for the purpose of breaking its fall if for any cause it should reach the bottom of the shaft.

FLY-TRAP.—Benjamin Sanford, Smartsville, Yuba Co. No. 336,676. Dated Jan. 6, 1886. This invention relates to that class of fly-traps in which an opaque vessel carrying an external casing of wire gauze is lowered into a pan in which the flies are feeding; and it consists in certain new and useful improvements relating to the lining of the pan with soft dark cloth, a small slide door connecting the exterior or light chamber with the interior or dark chamber, whereby the dead flies are removed; a self-regulating valve or gate in the top of the dark chamber through which the flies pass to the light chamber, and a netting in the dark chamber adapted to be vibrated for the purpose of accelerating the movements of the flies therefrom.

KNIFE-CLEANER.—Ishmael Lawson, Butte, M. T., No. 333,761. Dated Jan. 5, 1886. The object of this invention is to provide a simple device by which knives may be readily and rapidly cleaned. It consists, in a knife-cleaner, of a combination of oppositely rotating parallel rollers upon which the cleaning composition or substance is placed, and adapted to receive and rub the knife blade between them, a traveling carriage moving to and fro between the rollers, and operated thereby in a direction opposite to their direction of revolution, and a clamp for the knife handle to feed the blade between the rollers, said clamp being hinged upon the carriage, whereby it is adapted to be adjusted through a vertical arc to guide the blade to the rollers. Various details of construction and operation are covered by the patent.

THE estimated gold production of Colorado in 1885, exceeded that of 1884 by \$750,000. The production of silver declined \$300,000,

Utah's Metal Product for 1885.

Wells, Fargo & Co.'s Statement of the Mineral Product of Utah for 1885.

BASE BULLION.		Lbs. Lead Unrefined	Ozs. Fine Silver.	Ozs. Fine Gold.
Germania Lead Works.	7,975,400	629,754	1,404	
Hannover	9,352,044	606,055	2,158	
Iron Silver Mining Co. (three months).	4,905,932	123,002		
Mingo Furnace Co.	11,744,000	403,081	1,589	
Net Product Base Bullion.	33,977,376	1,822,582	5,148	
Lead Silver and Gold in Ores Shipped.	20,346,800	1,360,094	2,141	
Total.	64,318,776	3,189,576	7,289	

DORE BARS.		Ozs. Fine Silver.	Ozs. Fine Gold.
Ontario Silver Mining Co.	2,378,821	700	
Silver Reef District.	375,933		
Other Mills and Placers.	28,359		914
Total Dore Bars.	2,783,113		1,614

RECAPITULATION.

54,318,776 lbs. Unrefined Lead at \$15 per ton.	\$1,222,172.40
5,972,089 ozs. Fine Silver at \$1.04.	6,211,506.56
8,903 ozs. Fine Gold at \$20.	178,060.60
Total Export Value.	\$7,611,829.62

Computing the Gold and Silver at its mint valuation and other metals at their value at the seaboard, it would increase the value of the product to \$16,078,305.65.

Comparative Statement, showing the quantity of the Silver and Gold contained in base bullion produced in Utah:

YEAR.	Total Ounces of Silver Produced.	Total Ounces of Gold Produced.	Ounces of Silver in Ores and Base Bullion.	Ounces of Gold in Ores and Base Bullion.	Per Cent of Total Silver Product.	Per Cent of Total Gold Product.
1877	4,359,703	17,325	2,102,098	11,085	48.2-10	63-4-10
1878	4,357,328	15,040	2,108,339	10,165	48.3-10	67.5-10
1879	3,835,947	15,932	1,797,589	5,603	46.8-10	35.7-10
1880	3,783,566	8,020	1,403,819	2,878	37.1-10	35.8-10
1881	5,400,191	7,055	2,643,899	2,622	48.9-10	32.0-10
1882	5,435,444	6,030	2,581,789	5,016	47.3-10	55.5-10
1883	4,531,763	6,091	2,351,190	5,597	51.8-10	80.
1884	5,069,488	5,553	3,253,984	3,896	57.4-10	68.8-10
1885	5,972,089	8,903	3,189,576	7,289	53.4-10	81.8-10

Comparative Statement of the value of lead bullion, including silver and gold necessarily produced in its manufacture west of the Missouri River, compiled from the annual reports issued by John J. Valentine, Vice-President and General Manager, Wells, Fargo & Co., San Francisco.

YEAR.	Total Value of Precious Metals, including Lead.	Total Value of Lead Bullion, including Gold and Silver Contents.	Per Cent of Entire Product.
1878	\$81,154,622	\$14,740,581	18.1-10
1879	75,349,501	19,234,304	25.5-10
1880	80,167,930	28,114,561	35
1881	84,504,417	30,253,430	35.8-10
1882	92,411,835	35,798,750	38.7-10
1883	90,313,612	34,510,022	38.5-10
1884	84,975,954	31,101,250	36.7-10

The above statement shows a marked annual increase in the percentage of precious metals produced in the manufacture of base bullion. It demonstrates conclusively that the process of smelting is in the ascendant for the reduction of ores, and that any cruises tending to decrease or discourage the production of lead, will produce a corresponding decrease in the gold and silver production west of the Missouri River.

Sierra County Mines.

The drift and quartz mines of Sierra county have yielded well during the past year, and promise to do much better for the new. The Bald Mountain Extension Co., at Forest City, employ about 100 men, and are now working three shifts, eight hours each, in the breasts. More gravel is actually taken out than under the old ten-hour rule. During the last two months of the closing year, \$12,000 in dividends were pocketed by the lucky stockholders, and the prospect is that there will be at least hereafter a regular monthly dividend of \$6000 or ten cents a share on the capital stock. The gold ledge, 260 feet wide, is being followed northeast up the ridge and is believed to extend for miles through a comparatively undeveloped country. Thus far considerably more than a quarter million of dollars has been the gross yield of the channel, whilst the total assessments were only \$57,390. The Bald Mountain, the adjoining drift claim, whose gross yield to date is about \$4,000,000, is still being profitably worked. The Ruby drift mine is yielding good returns, employing quite a number of men. The Alaska Company, Pike City, employ over 100 men, and have a rich and extensive claim. The Sierra Buttes and Young America quartz ledges, at Sierra City, are very rich—especially the latter, recently discovered, with a gross yield of about \$80,000 per month. The numerous adjoining locations promise well for the future. Most of the other mines throughout the county are paying well on an average. This is a desirable field for judicious investment of capital, as under these lava-capped mountains are wide and extensive gold ledges and channels.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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Grass Valley Notes.

At Grass Valley they are building a ditch from the Idaho mine to a point on the south side of Wolf creek, just above the Crown Point, for the purpose of conveying water to the Crown Point and Badger mines, and when completed the Badger mine will probably resume work—capacity of ditch 400 inches, length of ditch one and a fourth miles. The work on the ditch has been let at contract for \$825. Mr. Connelly has the contract. The ditch is to be completed about the 20th of February. Chas. E. Uren, C. E., has supervision of the work.

The general prospects of Grass Valley are still improving. A good ledge is now being opened on what is claimed to be the southeastern extension of the Crown Point, a rich looking ledge being intersected by a tunnel 150 feet long, run into the south side of Wolf creek, about 300 yards to the southeast of the Crown Point mill. The ore shows a large percentage of good looking galena and sulphurets, which promise a good mine.

HEINE BOILERS.—The contract for building the four large new boilers for the Lake Merced Pumping Works of the Spring Valley Water Company, to replace those rendered useless by the recent explosion, has been given to the Risdon Iron Works. There was a good deal of competition for this contract. The Risdon Works will furnish the Heine boilers, a type for which they have the agency, and which has given great satisfaction where used. The boilers will be made in the city by the Risdon Works.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

THE CALIFORNIA HOMOEOPATH, with its issue for the current month, enters upon Vol. IV. The handsome editorial pages inform us that Hahnemann College of this city, "the one institution of the coast devoted to the teaching of homoeopathy," is in a thriving condition, and that the physicians of this school in San Francisco have formed a club, whose meetings prove highly enjoyable. Among the contents are three original articles, besides selections of practical bearing.

PRACTICAL HYDRAULICS.

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PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

Thus, by interpolation, may Table 16 be completed with the approximate values of the coefficient (c_f) of resistance.

TO FIND THE VELOCITY OF WATER FLOWING THROUGH SHORT PIPES.

Rule 33.—Extract the square root of 64.4 times the given head (total head) in feet, divided by 1.505, increased by the product of the length of the pipe in feet, and the coefficient of resistance—coefficient found in and computed from Table 16—due the given diameter, divided by the hydraulic mean radius.

Rule 33 corresponds with Eq. (128).

EXAMPLES AND CALCULATIONS WITH RESPECT TO THE FLOW OF WATER THROUGH SHORT PIPES.

Ex. 66.—A pipe being 1 foot in diameter, 10 feet long, and the head of water being one hundred feet, what will be the velocity of flow per second?

Cal.—As the pipe is very short, it is evident that a large portion of the head will be expended in generating the velocity. Let it be assumed that not less than one-half the total head will be so expended. In which case the velocity will exceed 50 feet per second. Turning to Table 16, we perceive that the coefficient of resistance due a velocity of 16 feet in a pipe 1 foot diameter is .0049, and that the decrease of the preceding coefficients in the 1 foot diameter column, corresponding to the increase of velocity, is very small. Let, then, the least coefficient in column be taken, $c_f=.0049$.

Hydraulic mean radius $r=\frac{1}{4}$.

Substituting these values of $c_f=.0049$, $r=\frac{1}{4}$; also, the values of $2g=64.4$, $h=100$ feet, and $l=10$ feet in Eq. (128); or, in other words, apply Rule 33:

$$v=\left\{\frac{64.4 \times 100}{1.505+.0049 \times 10 \div \frac{1}{4}}\right\}^{\frac{1}{2}}$$

Whence, $v=61.53$ feet.—Ans.

It will be remembered that equation (128), or Rule 33, is to be employed in finding the velocity when the given length of the pipe is less than one thousand times its diameter.

Ex. 67.—The head being 10 feet, what will be the velocity of water flowing through a pipe 2 feet in diameter and 1000 feet long?

Cal.—Assume by way of trial that the velocity will be 9 feet per second.

By Table 16, the coefficient of resistance due 9 feet velocity in a 2-foot pipe is $c_f=.0045$.

Hydraulic mean radius $r=\frac{2}{4}=\frac{1}{2}$.

Substituting the values of $c_f=.0045$, $r=\frac{1}{2}$, $h=10$, $l=1000$, and $2g=64.4$, in equation (128); or applying Rule 33:

$$v=\left\{\frac{64.4 \times 10}{1.505+.0045 \times 1000 \div \frac{1}{2}}\right\}^{\frac{1}{2}}$$

Whence, $v=7.83$ feet, trial result.

Turning again to Table 16, we find that, corresponding to 8 feet velocity nearest approximate to our trial, result 7.83 feet, the coefficient of resistance is $c_f=.0045$, the same as employed in our calculation.

Therefore we have:

$$v=7.83 \text{ feet.} \text{---Ans.}$$

Had the tabulated coefficient of resistance corresponding to the velocity found by trial, not have been equal to, or closely approximate to, that employed in our calculation, it would have been necessary to repeat the operation, using this new coefficient.

Ex. 68.—The head being 20 feet, the pipe 4 feet diameter, and 4,000 feet long, what is the velocity of flow per second?

Cal. 1st.—Assume the velocity for the purpose of trial 9 feet. Then:

By Table 16, $c_f=0.035$.

Hydraulic mean radius $r=\frac{4}{4}=1$.

Substituting the values of $c_f=.0036$, $r=1$, $h=20$ feet, $l=4,000$ feet, and $2g=64.4$ in Eq. (128); or applying Rule 33:

$$v=\left\{\frac{64.4 \times 20}{1.505+.0036 \times 4000 \div 1}\right\}^{\frac{1}{2}}$$

Whence, $v=8.999$ feet.—Ans.

Cal. 2.—Employing formula (130), which is for a long pipe, there results:

$$v=\left\{\frac{64.4 \times 20}{.0036 \times 4000 \div 1}\right\}^{\frac{1}{2}}$$

Whence, $v=9.428$ feet.—Ans.

Comparing these results, the difference is seen to be .429 feet velocity per second. It appears quite evident, then, that 1.505, the first term in the denominator of the right hand member of Eq. (128)—an equation for velocity of water in short pipes—cannot be omitted, where accuracy is required, even if the length of the pipe, as in the given example, is 1,000 times the diameter.

Ex. 69.—The head being 12 feet, the pipe 15 inches diameter, 1,200 feet long, let it be required to find:

- The velocity of flow per second;
- The discharge in cubic feet per second;
- The loss of head due velocity;
- The loss of head due resistance of entry;
- The head expended in overcoming the resistances within the pipe;
- The sine of slope;
- The fall per mile due resistances in pipe;
- And the total fall per mile.

Cal.—Assume by way of trial the velocity of flow=6 feet per second.

By Table 16, the coefficients of flow due a velocity of 6 feet in a 12-inch pipe, are $c_f=.0053$; and in a 24-inch pipe, $c_f=.0046$.

The hydraulic mean radii are as follows:

$$\text{For } 12", r=\frac{1}{4};$$
$$\text{And for } 24", r=\frac{3}{4}=\frac{1}{2}.$$

Substituting the values of $c_f=.0053$, and of $r=\frac{1}{4}$, in Eq. (133); also, the values of $c_f=.0046$, and of $r=\frac{1}{2}$ in the same equation, there results:

$$m+4n=.0053. \quad (a)$$

$$m+2n=.0046. \quad (b)$$

$$\text{Whence, } n=.00035. \quad (c)$$

Substituting value of (n) in Eq. (a),

$$m=.0039. \quad (d)$$

Substituting the values of m of (d), and of n of (c) in Eq. (133),

$$c_f=.0039+\frac{.00035}{r}. \quad (e)$$

The hydraulic mean radius due 15", $r=\frac{5}{16}$.

Substituting this value of $r=\frac{5}{16}$ in Eq. (e),

$$c_f=.0039+.00035 \div \frac{5}{16}=.0050. \quad (f)$$

Substituting the values of $c_f=.0050$, $r=\frac{5}{16}$, $h=12$ feet, $l=1,200$ feet, and $2g=64.4$, in Eq. (128), or applying Rule 33,

$$v=\left\{\frac{64.4 \times 12}{1.505+.0050 \times 1200 \div \frac{5}{16}}\right\}^{\frac{1}{2}}$$

Whence, $v=6.11$ feet.—Ans. (h)

The value of v of Eq. (h) is so near the assumed value, 6 feet, it will be unnecessary to repeat the operation for finding a nearer approximate to the true value.

Area of cross-section of given pipe,

$$a=(\frac{1}{16})^2 \times .7854=1.227 \text{ square feet.} \quad (i)$$

Quantity of flow is equal to the product of the area of cross-section and the velocity; hence,

$$Q=av=1.227 \times 6.11=7.5 \text{ cubic feet.} \text{---Ans.} \quad (j)$$

To find the loss of head due velocity, substitute the value of v of Eq. (h), and the value of $2g=64.4$, in Eq. (110),

$$h_v=(\frac{v}{2g})^2=.58 \text{ feet.} \text{---Ans.} \quad (k)$$

To find the loss of head due the resistance of entry, substitute the value of $c_e=.505$, of Eq. (127), and the value of $h_v=.58$, of Eq. (k), in (116),

$$h_e=.58 \times .505=.29 \text{ feet.} \text{---Ans.} \quad (l)$$

To find the head expended in overcoming the resistances within the pipe, substitute the values of $h_v=.58$ of Eq. (k), of $h_e=.29$ of Eq. (l), and of $h=12$ feet, the total or given head in Eq. (108), and transposing:

$$h_f=12-.58-.29=11.13 \text{ feet.} \text{---Ans.} \quad (m)$$

To find the sine of slope, divide the head, h_f , expended in overcoming the resistances in the pipe by the length of the pipe. Thus, the sine of the angle of slope, C E D, Fig. 19, is in the given example:

$$s=\frac{h_f}{l}=\frac{11.13}{1200}=.009275. \text{---Ans.} \quad (n)$$

To find the fall per mile:

$$\text{Let } F=\text{fall in feet per mile:}$$
$$1 \text{ mile}=5280 \text{ feet.} \quad (o)$$

$$\text{Then } 1:.009275::5280:F. \quad (p)$$

Whence, $F=48.972$ feet.—Ans. (g)

When 1.505, the leading term in the denominator

of Eq. (128), or, in other words, when Eq. (130) is employed instead of Eq. (128), it is assuming that in Fig. 19, A E is the slope or hydraulic gradient instead of C E, which is erroneous.

But when the pipe is very long in comparison with its diameter, the error is insignificant.

Let F_m =the entire fall per mile.

Substitute the values of $h_v=.58$ of Eq. (k), and $h_e=.29$ of Eq. (l) in Eq. (109),

$$h_i=.58+.29=.87. \quad (r)$$

$$\text{Then } F_m=F+h_i=48.972+.87=49.842 \text{ feet.} \text{---Ans.}$$

FLOW OF WATER IN LONG PIPES.

For a given or determined velocity, the inlet head (h_i), remains constant, regardless of the length of the pipe.

In general, if (F) denote the fall per mile—fall requisite to overcome the resistances within the pipe—(n) the number of miles, length of the pipe, and F_i the total fall, then will

$$F_i=nF+h_i=h_f+h_i. \quad (a')$$

In the computation of the following table for the velocity and quantity of flow in long pipes, Eq. (130), in which the value of $s=\frac{h_f}{l}$ is given, has been employed. The inlet head, (h_i), if required, will be determined from the velocity.

TABLE 17.

Velocities and Quantities of Flow in Clean Iron Pipes due given Slopes and Diameters.

Fall per Mile.	Sine of Slope $s=\frac{h_f}{l}$	DIAMETERS.							
		1 1/2"=.03125 feet.		2"=.04167 ft.		3"=.0625 ft.		4"=.1067 ft.	
		Veloc'y Ft. per Sec.	Cubic Feet per Sec.	Veloc'y Ft. per Sec.	Cubic Feet per Sec.	Veloc'y Ft. per Sec.	Cubic Feet per Sec.	Veloc'y Ft. per Sec.	Cubic Feet per Sec.
21.12	.004	.....	.....	.....	.....	.....	.....	.....	.....
26.40	.005	.....	.....	.....	.....	.....	.....	.....	.....
31.68	.006	.....	.....	.....	.....	.....	.....	.....	.....
36.96	.007	.....	.....	.....	.....	.....	.....	.....	.....
42.24	.008	.....	.....	.....	.....	.....	.....	1.04	.0057
47.52	.009	.....	.....	.....	.....	.....	.....	1.13	.0062
52.80	.010	.....	.....	.....	.....	1.03	.0082	1.24	.0068
63.36	.012	0.698	0.0054	0.89	.0012	1.14	.0035	1.43	.0078
73.92	.014	0.763	0.0059	0.91	.0013	1.23	.0038	1.54	.0084
84.48	.016	0.826	0.0063	0.99	.0014	1.34	.0041	1.64	.0089
95.04	.018	0.888	0.0069	1.05	.0014	1.45	.0045	1.76	.0096
105.6	.02	0.947	0.0073	1.10	.0015	1.52	.0047	1.81	.0099
158.4	.03	1.18	0.0090	1.44	.0020	1.92	.0059	2.28	.0125
211.2	.04	1.38	0.011	1.77	.0024	2.30	.0071	2.73	.0149
264.0	.05	1.58	0.013	2.04	.0028	2.60	.0080	3.05	.0167
316.8	.06	1.79	0.014	2.31	.0032	2.85	.0087	3.40	.0186
369.6	.07	1.98	0.015	2.49	.0034	3.10	.0095	3.64	.0199
422.4	.08	2.13	0.016	2.68	.0037	3.30	.0101	3.92	.0214
475.2	.09	2.36	0.018	2.85	.0039	3.54	.0109	4.18	.0228
528.0	.10	2.49	0.019	3.04	.0041	3.73	.0114	4.44	.0242
633.0	.12	2.76	0.021	3.32	.0045	4.18	.0128	4.90	.0268
739.2	.14	3.04	0.023	3.46	.0047	4.50	.0138	5.29	.0289
844.0	.16	3.30	0.025	3.84	.0052	4.83	.0148	5.64	.0308
950.4	.18	3.50	0.027	4.09	.0056	5.11	.0157	6.00	.0328
1056	.20	3.71	0.028	4.31	.0059	5.40	.0166	6.33	.0346
1320	.25	4.15	0.032	4.83	.0066	6.10	.0187	7.14	.0390
1584	.30	4.58	0.035	5.36	.0073	6.73	.0206	7.90	.0432
2112	.40	5.32	0.041	6.26	.0086	7.79	.0239	9.13	.0499
2640	.50	5.99	0.048	7.07	.0097	8.82	.0271	10.34	.0565
3168	.60	6.62	0.051	7.80	.0107	9.79	.0300	11.57	.0632
3696	.70	7.20	0.055	8.47	.0116	10.76	.0330	12.71	.0694
4224	.80	7.75	0.059	9.14	.0125	11.72	.0357	.....	.....
4752	.90	8.22	0.063	9.80	.0134	12.60	.0379	.....	.....
5280	1.00	8.74	0.067	10.39	.0142	.....	.....	.....	.....

TABLE 17.

Velocities and Quantities of Flow in Clean Iron Pipes due given Slopes and Diameters.

Fall per Mile.	Sine of Slope	DIAMETERS.							
		1 1/2"=.125 feet.		2"=.1458 ft.		3"=.0833 ft.		4"=.1667 ft.	
		h s= $\frac{h}{l}$	Vel'o Ft. per Sec.	Cubic Feet per Sec.	Vel'o Ft. per Sec.	Cubic Feet per Sec.	Vel'o Ft. per Sec.	Cubic Feet per Sec.	Vel'o Ft. per Sec.
21.12	.004	.....	.....	.....	.....	1.18	.0258	1.35	.0460
26.40	.005	.....	.....	1.21	.0201	1.34	.0292	1.52	.0518
31.68	.006	1.19	.0146	1.36	.0227	1.50	.0327	1.68	.0573
36.96	.007	1.29	.0158	1.45	.0243	1.60	.0349	1.81	.0617
42.24	.008	1.39	.0171	1.58	.0264	1.73	.0378	1.94	.0662
47.52	.009	1.48	.0182	1.70	.0284	1.87	.0408	2.07	.0706
52.80	.010	1.60	.0196	1.79	.0299	1.98	.0432	2.20	.0750
63.36	.012	1.73	.0212	1.95	.0326	2.22	.0484	2.44	.0832
73.92	.014	1.86	.0228	2.13	.0356	2.36	.0515	2.62	.0903
84.48	.016	2.01	.0247	2.22	.0371	2.50	.0546	2.78	.0948
95.04	.018	2.10	.0258	2.35	.0392	2.63	.0574	2.93	.0999
105.6	.02	2.28	.0279	2.53	.0422	2.80	.0611	3.15	.1074
158.4	.03	2.81	.0346	3.10	.0518	3.39	.0740	3.81	.1299
211.2	.04	3.37	.0413	3.69	.0617	4.00	.0873	4.51	.1538
264.0	.05	3.73	.0458	4.28	.0715	5.02	.1095	5.34	.1821
316.8	.06	4.11	.0504	4.69	.0783	5.50	.1200	5.85	.1995
369.6	.07	4.42	.0542	5.02	.0838	5.90	.1288	6.34	.2162
422.4	.08	4.73	.0580	5.36	.0895	6.30	.1375	6.77	.2309
475.2	.09	5.05	.0619	5.63	.0940	6.61	.1442	7.19	.2442
528.0	.10	5.48	.0672	6.01	.1003	6.98	.1523	7.61	.2595
633.0	.12	6.03	.0740	6.65	.1110	7.49	.1674	8.27	.2820
739.2	.14	6.54	.0802	7.19	.1200	8.01	.174	8.89	.3031
840.0	.16	7.01	.0862	7.70	.1285	8.50	.1855	9.48	.3233
950.0	.18	7.50	.0923	8.22	.1372	8.96	.1955	10.04	.3424
1056.	.20	7.88	.0969	8.69	.1450	9.38	.2047	10.63	.3624
1320.	.25	8.77	.1079	9.69	.1617	10.43	.2276	11.86	.4054
1584.	.30	9.65	.1187	10.62	.1773	11.38	.2483	13.15	.4084
2112.	.40	11.23	.1380	12.28	.2050	12.98	.2833	.....	.....
2640.	.50	12.60	.1550	.....	.....	.....	.....	.....	.....

ENGINEERING NOTES.

The Panama Canal.

The difficulties connected with the construction of the Panama canal, appear to be fast culminating. Evidence accumulates which appears to show that the engineering difficulties in the way of maintaining the existence of the canal after it is finished are quite as great, if not greater than in the way of its construction.

It appears that the average annual rainfall on the line of the canal is over 12 feet, and all of this deluge falls during a period of about six or seven months. At times six inches of rain falls in six hours, causing the Chagres river to rise from a stream of two feet to a torrent of 40 feet deep, its width increasing from 80 to 500 yards. During these floods 10,000,000 cubic feet of water pass a given point every minute.

The sea level canal would of necessity be the receptacle of all this water, together with the water from all other neighboring streams, large and small, and it behooves count De Lesseps to carefully consider what he will do with it. Now bear in mind that this flood carries with it huge trees, "villages of houses," "rocks" and "masses of vegetation."

In view of the accumulation of present and anticipated difficulties, it was recently reported that the French Government will, at the request of the Panama Canal Company, send Rousseau to inspect and report on the conditions and prospects of the canal. If the report is favorable a loan will be granted so as to push the work to completion. If it is adverse the enterprise will be allowed to collapse and the Government will assume the responsibility.

A still later report is to the effect that De Lesseps himself will go to the isthmus in company with a Government deputation of engineers. He also invites the presence there of engineers from other countries—particularly England and the United States, to consider upon what is best to do under the circumstances with which the project is surrounded.

ENGINEERING BY THE ANCIENTS.—At the meeting of the British Association, the president of the section on mechanical science, B. Baker, civil engineer, recalled certain engineering feats of the ancients: "I have no doubt that as able and enterprising engineers existed prior to the age of steam and steel as exist now, and their work was as beneficial to mankind, though different in direction. In the important matter of water supply to towns, indeed, I doubt whether, having reference to facility of execution, even greater works were not done 2000 years ago than now. Herodotus speaks of a tunnel, eight feet square and nearly a mile long, driven through a mountain in order to supply the city of Samos with water, and his statement, though long doubted, was verified in 1882 through the abbot of a neighboring cloister accidentally unearthing some stone slabs. The German Archaeological Society sent out Ernst Fabricius to make a complete survey of the work, and the record reads like that of a modern engineering undertaking. Thus, from a covered reservoir in the hills, proceeded an arched conduit about 1000 yards long, partly driven as a tunnel and partly executed on the 'cut and cover' system adopted on the London underground railway. The tunnel proper, more than 1100 yards in length, was hewn by hammer and chisel through the solid limestone rock. It was driven from the two ends like the great Alpine tunnels, without intermediate shafts, and the engineers of 2400 years ago might well be congratulated for getting only some dozen feet out of level and little more out of line. From the lower end of the tunnel branches were constructed to supply the city mains and fountains, and the explorers found ventilating shafts and side entrances, earthenware socket pipes, with cement joints, and other interesting details connected with the water supply of towns."

FROM LONDON TO BOMBAY.—The vast scheme of a railway route from London to Bombay is being discussed by eminent French and British engineers. According to statements made the whole of the journey will be accomplished by train, save the passage of the Channel and the crossing of the Straits of Gibraltar. From Tangier the railway would run across Morocco and make a junction with the Algerian lines, afterward continuing by Tunis and Tripoli to Cairo; thence the line would continue along the Euphrates Valley and the shores of the Persian Gulf to Kurrachee, the extreme westerly point of the Indian railway system. Quick trains would, it is stated, cover the distance between London and Bombay in nine days.

EADS SHIP RAILWAY.—The proposed subsidy to the Eads Ship Railway Company amounts to a guarantee of two-thirds of its estimated revenue for fifteen years, Mexico having already guaranteed the other third. If money should be advanced under this guarantee the company is required to pay it. The cost to the Government, if all should go well, would be nothing; but if the project should be an engineering failure, or if the company should fail to earn anything or repay any of the advances, the United States might be called upon for \$2,500,000 per annum for fifteen years, or \$45,000,000 in all. This is the extreme limit of liability, to be lessened by two-thirds of the net earnings, whatever they may be.

USEFUL INFORMATION.

GLASS PASTE OF THE ANCIENTS.—The ancients found or attempted to find, whatever the difficulty of the undertaker, all things that could afford either beauty or variety to man's eye. They discovered glass, and they carried the art of making it to a perfection which their posterity are very far from ever having attained. The most useful of these works of the ancients was certainly the glass paste with which they so exactly imitated the most precious engraved gems, either in cameo or intaglio. Nor was it only in small pastes that the ancients exercised this talent and their ingenuity; for from the fragments of uncommon dimensions which have been found we can see what expertness the ancients had acquired even in large works of this kind. As an instance—the large cameo in the Bibliotheca Vaticana, described by Winklemann; on it, in a not much raised basso-relievo, are represented several white figures, Bacchus and Ariadne with two satyrs, on a very lively deep azure ground. This specimen is, in its oblong shape, more than a Roman foot long, and two-thirds of a foot wide. Another basso-relievo, a foot longer, in three compartments, in which are the little statue of Apollo and those of two Muses, is mentioned by Passeri, and Olivieri deems it the work of a most eminent artist. It is, moreover, certain that these cameo or glass pastes were affixed on the walls of temples and houses. This is the more likely, says Reiffenstein, as whole pavements of rooms have been found entirely worked in these glass pastes, and they may be considered to have been frequently used in mosaics; for the artists, particularly if they had to represent leaves or flowers, borrowed from the glass pastes the beautiful colors they could not find among the stones of which they made use.

FINE WORK WITH SAND.—We should infer from what we have seen and heard that every workman should have a few grains of sand mixed with a little grindstone dust in fitting up the parts of machinery. Gear wheels are ground on their shafts when the bore of the wheel has been left tapering by the wearing away of the boring tool and left with such a close fit that the key could not be driven till the wheel worked loose, and it is just the stuff to grind out a loose pulley where it is not loose enough on its shaft to rattle. The hardest metal can be cut without drawing the temper by using this mixture on a saw made of soft iron. Not only this but the mixture comes in handy in setting up the machine where the parts are fitted. All there is to be done when a piece of iron is to be marked in order to drill a hole, is to chalk over the surface where the hole is to be drilled, place the casting over it and sprinkle down the hole of the casting a little of the granular mixture, while a worn-out tool is rattled about in the bore to knock the grains into every portion of the aperture. This dusted surface on a ground work of chalk stands out in bold relief, and the most timid workman would not hesitate to mark with the prick-punch for the exact center of the hole that is to be bored on the drilling machine.

IS WATER FATTENING?—It has been observed that water is fattening, that those who drink large quantities of water have a tendency to fullness and rotundity. That there is considerable truth in this observation the *Medical and Surgical Reporter* fully substantiates. That excessive imbibition of very cold (iced) water (especially when one is very warm) is not to be recommended, yet we have reason to believe that the unlimited use of pure spring water, at its natural temperature, is not only very conducive to health, but has an actual tendency to favor a fullness and roundness of body. Whether this is the result of a better action on the part of the digestive, assimilative, and depurative functions, owing to the internal cleanliness or flushing of the human sewers produced by large quantities of water, or whether water has some specific action in producing this fullness, we do not know, neither does it signify, since observation confirms as a fact that the free use of water does have this effect.

METHODS OF RESTORING OLD LACE GOODS TO THEIR ORIGINAL COLOR.—The following singular method of treating old and valuable lace goods so as to restore them to their original shade of color and condition is said to have been one of the secret processes used by Parisian dyers, but now made public in the *Farber Zeitung*. The lace is lightly ironed to smooth it, then folded with care and sewn up in a linen bag, which is then suspended in pure olive oil for 24 hours; the oil drained off without disturbing the lace, and then at length her placed for 15 minutes in hot soap and water, then in warm water, and lastly in cold water containing a little boiled starch, and again drained. The lace is now taken out of the linen bag and dried in a stretched state upon frames provided with needles.

CRUSHING RESISTANCE OF BRICK.—Walls laid up of good, hard-burned bricks, in mortar composed of good lime and sharp sand, will resist a pressure of 1500 pounds per square inch, or 216,000 pounds per square foot, at which figures it would require 1600 feet high of 12 inch wall to crush the bottom courses, allowing 135 pounds as the weight of each cubic foot. Walls laid up in same quality of brick and mortar, with one-third Portland

cement added, will resist 2500 pounds per square inch, or 360,000 pounds per square foot, which would require a height of wall 2700 feet to crush the bottom bricks.

THE CAMERA IN A NEW ROLE.—Practical reformers, who have been trying to abolish low concert saloons, and other vicious resorts in New York City, have met with opposition from the very people who are presumably their helpers. About some of these places there is sufficient of the ward politician's influence to make even the policeman a consenting party; and consequently he is sometimes quite oblivious to violations of the law which are plain enough to everybody else. This state of affairs has led the reformers to turn to the more reliable testimony offered by a good photograph. The saloons are brilliantly lighted by electricity as a rule, and the reformer, armed with a pocket camera and instantaneous photographic plates, has succeeded in taking over 100 views of the saloons and streets in front of them after one o'clock in the morning when the law provides that they shall be closed. A number of the photographs contain clock dials, which thus offer testimony as to the hour.

ANOTHER IMITATION.—The advancement of sciences has been so rapid in the last fifty years that no one can foretell what changes the future has in store for us. Man has, or pretends that he has, made many improvements over nature. In fact nature seems to be playing an unimportant part in furnishing the basis for our modern food supply. If the goddess of nature should suddenly eliminate the maple from the catalogue of trees, does any one think for a moment that the world would be left without maple sugar? If there is any one so foolish as to think so, he is not acquainted with the resources of the modern man. Listen! A patent has been secured for making imitation maple syrup. Here is the way it is done: Hickory bark is soaked in water and an extract is thus obtained, which, added to cane or glucose syrup, gives it the maple taste and smell.

BLEEDING AT THE NOSE.—The *Scientific American* says the best remedy for bleeding at the nose, as given by Dr. Gleason at one of his lectures, is in the vigorous motion of the jaws as if in the act of chewing. In the case of a child a wad of paper should be inserted to chew it hard. It is the motion of the jaws that stops the flow of blood. This remedy is so very simple that many will feel inclined to laugh at it, but it has never been known to fail in a single instance, even in the severest cases.

A BELT TRAVELING 800 FEET PER MINUTE will safely transmit one horse power for each inch in width if the pulleys are both the same diameter and the belt laps over one half of each; but if the belt laps on but one-quarter of either pulley's circumference, then it would have to travel 1230 feet per minute to transmit a horse power for each inch in width.

GOOD HEALTH.

ABSENT MINDEDNESS AND LUNACY.—There are many firm believers in the theory that most people are crazy at times, and facts seem to support their belief. A wise man will step backward off a porch or into a mud puddle; a great philosopher will hunt for the specks that are in his hand or on his forehead; a hunter will sometimes shoot himself or his dog. A working girl had been feeding a great clothing knife for 10 years. One day she watched the knife come slowly down upon her hand. Too late she woke out of her stupor, with one hand gone. For a few seconds her mind had failed, and she sat by her machine a temporary lunatic, and had watched the knife approach her own hand. A distinguished professor was teaching near a canal. Walking along one evening in summer, he walked as deliberately into the canal as he had been walking along the path a second before. He was brought to his senses by the water and mud and the absurdity of the situation. He had on a new suit of clothes and a new silk hat, but though the damage was thus great, he still laughs over the adventure. Our mail collectors find in the iron boxes along the streets, all sorts of papers and articles which have been put in by some hand, from whose motions the mind has become detached for a second. A glove, a pair of spectacles, a deed, a mortgage, a theater ticket goes in, and on goes the person, holding on to the regular letter which should have been deposited. This is called absent-mindedness, but it is really a brief lunacy. A lunatic is a person whose mind is constantly out of balance. Such is the only difference between lunacy and absent-mindedness.

WHAT TO DO WITH AN HYSTERICAL WOMAN.—When a woman is attacked with hysterical excitement don't begin by trying to bully her into keeping quiet, which will excite her the more; nor pester her by telling her how she is annoying others. The patient is the first thing to be thought of; let her feel that you are doing everything for her comfort and she will be grateful and struggle to aid your efforts. If possible, clear the room of other people, so that they may not annoy her. Open the window and let the air blow over her face. Bathing the face and hands with cold water relieves the faintness; aromatic spirits of ammonia sprinkled on a cloth and laid on the chest is good. If

held too close to the nostrils it causes instead of relieving oppression in breathing. Try to relieve the mind of the patient of any anxiety; she should be soothed into a state of perfect mental calm. If she does not seem to be getting better medicine should be administered.

THE CHEMISTRY OF FOOD.—There is no reason why every housekeeper and cook should not have a knowledge of the chemistry of cooking, and of the healthfulness of certain articles of food. At this particular season of the year, nature supplies us with much that is cooling in the way of fruit and summer vegetables, which are not only delicious articles of food, but are really health preserving, for often a slight indisposition of children, or older persons, can be readily cured by the free use of these culinary remedies. Spinach has a direct effect upon complaints of the kidneys, the common dandelion, used as greens, is excellent for the same trouble, asparagus purifies the blood, celery acts admirably upon the nervous system and is a cure for rheumatism and neuralgia, tomatoes act upon the liver, beets and turnips are excellent appetizers, lettuce and cucumbers are cooling in their effects upon the system, beans are very nutritious and strengthening vegetable, while onions, garlic, leeks, chives, and shallots, all which are similar, possess medical virtues of a marked character, stimulating the circulatory system and the consequent increase of the saliva and gastric juice promote digestion. Red onions are an excellent diuretic and the white ones are recommended eaten raw as a remedy for insomnia. They are tonic and nutritious. A soup made from onions is regarded by the French as an excellent restorative in debility of the digestive organs. We might go through the entire list and find each vegetable possessing its especial mission of cure, and it will be plain to every housekeeper that a vegetable diet should be partly adopted at this period of the year, and will prove of great advantage to the health of the family.—*Good Housekeeping*.

A RAPIDLY GROWING HEALTH EVIL.—The American Inventor thinks that it is not generally known that coal oil and gasoline stoves rapidly vitiate the air of a room for breathing purposes by the development of large quantities of carbonic dioxide. How much longer must this continue before manufacturers of such goods will obviate this new danger by inventing some form of hood and pipe for conveying this poisonous gas to the outside atmosphere? Volumes have been written concerning the ventilation of homes and the injury that arises, especially to children and the infirm, from crowding too many people together in closed apartments, and now, with the introduction of oil and gasoline stoves in the household, a new difficulty presents itself, which is not easily remedied, in the endeavor to provide for health and comfort. These stoves are frequently found with several large burners in full blast, in small kitchens hardly large enough to contain air to supply the healthful requirements of one person. Evils of this kind, where they are widely spread, must have a terrible effect upon the strength of a population who breathe every day such an atmosphere, and, thus far, we have seen no remedy. It is certainly a question for grave consideration, and whoever takes the problem in hand at once, and provides a means, at low cost, to obviate this nuisance, will confer a great benefit upon thousands who are innocently undermining their health.

MIND AND DISEASE.—The influence of the mind upon the body, for sickness or health, is beyond all estimation. For a person to think he has a disease will often produce that disease. This we see effected when the mind is intensely concentrated upon the disease of another. It is found in hospitals that surgeons and physicians who make a specialty of a certain disease are liable to contract it themselves, and mental power is so great that sometimes people die of diseases which they only have in imagination. Well persons to remain well should remain cheerful and happy, and sick persons should have their attention drawn as much as possible from themselves. It is by their faith men are saved, and it is by their faith men die. If he will not die he can often live in spite of disease, and if he have little attachment for life he may slip away as easily as a child will fall asleep.

PRACTICAL OBSERVATION ON VACCINATION.—The following is from the report of one of the chief smallpox hospitals in the vicinity of London, England. Of 2000 who died of smallpox at the hospital, one-twelfth had a single indifferent scar. Of that number of imperfectly protected individuals, four per cent died. Of 1446 who had two good scars, only two per cent died, while of 518, who had three good scars, only one per cent died, and of 544 who had four or more good scars, only one-half of one per cent, or one in 200 died. No one should trust to a single scar, or even two. With one more good scar, the chances of taking the smallpox are almost as good as in cases where the patient has suffered from the genuine smallpox itself.

TENSION OF BLOOD VESSELS.—Experiments reported to the Paris Academy of Sciences prove that the pressure necessary to cause the rupture of blood vessels is very much greater than that to which they are normally subjected. The carotid artery of a dog required from 35 to 55 times the normal pressure of the blood, and the jugular vein from 32 to 35 times the usual force.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

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Steam Pumps—C. H. Evans Machine Works.
Pumps—Dow Steam Pump Works.
Machinery—Berry & Place Machine Co.
Centrifugal Roller Quartz Mills—F. A. Huntington.
Sheet Iron Pipe—Francis Smith & Co.

See Advertising Columns.

Passing Events.

The storm which prevailed along the coast this week was the worst we have experienced for some years as far as wind was concerned. It was predicted by the Signal Service so that vessels in the port did not put to sea. The storm-warning flag was displayed for the first time in California.

We issue this week a double sheet number of the PRESS containing our annual review of mining operations for the year past, with statistics of production, etc.

Colorado is showing a notable advance in gold production with prospects of an increase. That State is now second to California in this respect.

Renewed efforts are apparent all over this State in gold quartz mining and drift mining. It would appear from present evidences that 1886 will see a marked increase of product of gold from both these sources.

THE PLUMAS, EUREKA and SIERRA BUTTES paid semi-annual dividends in April and October. Both are California mines, but are owned in England. The Bird's Eye Creek of California and Richmond Consolidated of Nevada, are also owned in England. The former paid semi-annual dividends in June and December, and the latter an annual dividend on the 2d December.

THE MINING INDUSTRY IN 1885.

A Review of Operations and Results.

A Summary of Important Doings in the Mining Regions Last Year.

In reviewing the various mining operations carried on the past year throughout the Pacific States and Territories, our remarks must necessarily be of a general character, the great extent of country to be gone over, the diversified nature of these pursuits, and the multitude of mines now being worked rendering anything like a detailed description thereof impossible in a paper of this kind. Besides gold and silver, copper, lead, coal, iron and quicksilver are all being mined on an extensive scale in these west-lying regions, several other of the useful metals and minerals being also produced in a greater or less quantity. These several countries, all included, comprise an area of nearly a million square miles, to say nothing of Alaska, larger, perhaps, than all the others put together.

In comparing the bullion product of 1885 with that of 1884 the following, according to the annual reports of Mr. Valentine, the following appear to be the losses and gains made by the countries mentioned: Nevada shows a gain to the extent of \$324,182; Oregon, \$52,238; Washington, \$38,925; Alaska, \$135,986; Idaho, \$881,179; Montana, \$2,362,512; Utah, \$1,536,888; Colorado, \$1,138,251; and New Mexico, \$165,149. California shows a loss to the amount of \$236,316; Arizona, \$461,133; Dakota, \$360,224; Northwestern States of Mexico, \$293,356 and British Columbia, \$178,885.

The loss denoted in the case of California has been due to the closing of the hydraulic mines, causing a shortage to the extent of several millions that otherwise would not have occurred, as every other branch of gold mining in this State has been steadily increasing for several years past. It should be noted that the bullion made in California consists nearly all of gold and silver, whereas, it is in the case of Idaho, Montana, Colorado, New Mexico, Nevada, Utah and Arizona, largely composed of copper and lead, nearly two-thirds of the Utah and Colorado product being made up of these metals. As a gold producing country California continues to lead by a long way, turning out more of this metal than all these other countries put together, and much more than is produced by any other one country in the world. Of these \$23,607,896 worth of gold taken out in 1885 this State produced \$12,338,014, a sum which it is to be hoped will be increased at the rate of a million or more annually for several years to come. A like increment of silver may also be counted upon here for a considerable length of time.

It is a somewhat noteworthy fact, to which we have before called attention, that each year, California is said by residents of other States or Territories, and even by many of our own citizens, to be no longer a mining region of importance. We are told that our mines are played out, and that our bullion product has fallen off to nothing. Yet every year we keep our regular place in the list of bullion-producing States and Territories. Since the decline of bonanza days on the Comstock, Nevada has given first place to Colorado, and California has held second place, which she holds still. Moreover the other States count in their lead and copper in their totals. Our lead amounts to nothing, and our copper product is small; but we have numerous other mineral products of value which are not recognized in the statistics. We are the only State which produces quicksilver for instance, and were our other mineral products counted, we should make a still better showing. The nearest approach to California is Montana, with over fourteen millions, a large percentage of which is base bullion.

The most curious feature of this position of California is that the yield is effected without any "boom" or excitement of any kind. Capital has gone into other regions in abundance, new works have been put up, new mines opened and developed and new areas worked. Here we are working mainly on old districts and on old mines. It is an encouraging fact that among the most productive and richest of California mines are the oldest and deepest ones. This is a feature of gold mining which augurs well for the prospects of the State for many years to come.

The Bullion Product.

The past year, despite some obstacles and drawbacks, has been a moderately good one with our various mining industries, the total amount of bullion having somewhat exceeded that of the preceding year. As stated in a recent issue, the coast shows aggregate products as follows:

Gold, \$27,290,294; silver, \$46,489,939; copper, \$7,838,036; lead, \$8,562,991; total gross result, \$90,181,260.

In order to draw certain comparisons, we here repeat the statistics of bullion product for 1885, as compiled by John J. Valentine, of Wells, Fargo & Co., the authority on the subject:

STATES AND TERRITORIES.	Gold Dust and Bullion by Express.	Gold Dust and Bullion by other conveyances.	Base Bullion by Express.	Total.
California	\$11,750,490	8 57,624	\$1,000,158	\$15,808,672
Nevada	1,938,858	198,708	1,354,335	3,491,901
Oregon	359,822	107,436	407,426	874,684
Washington	196,000	20,000	4,323,366	4,539,392
Alaska	905,946	200,000	10,000	1,105,946
Idaho	2,001,000	0 317 512	5,811,914	7,819,426
Montana	3,382	3,061 424	13,695,000	16,759,806
Utah	2,959,000	2 024 000	21,372,000	24,355,000
Colorado	236,500	1,107,697	2,494,617	3,838,804
New Mexico	100,000	0 000	6,248,416	6,348,416
Arizona	2,469,823	100,000	2,903,652	5,473,475
Northern (West Coast)	437,704	1 938 310	20,707	2,406,044
British Columbia	120,000	1 938 310	20,707	808,884
	\$23,067,800	\$1,442 842	\$29,399,311	\$53,731 711
				\$90,181,260

The gross yield of 1885, shown above, segregated, is approximately as follows:

	Per cent.	Amount.
Gold	30.26	\$27,290,294
Silver	51.55	46,489,939
Copper	8.61	7,838,036
Lead	9.50	8,562,991
Total		\$90,181,260

Annual Products of Lead, Copper, Silver and Gold in the States and Territories West of the Missouri River, 1870-1885.

YEAR.	Produce as per W. F. & Co. estimates, including amounts from British Columbia and West coast of Mexico.	Produce as per Valentine's annuals, including amounts from British Columbia and west coast of Mexico.	Lead.	Copper.	Silver.	Gold.
1870	\$54,000,000	\$54,000,000	\$25,150,000	\$1,050,000	\$17,300,000	\$38,700,000
1871	62,384,000	62,384,000	25,784,000	1,100,000	19,280,000	40,800,000
1872	62,384,000	62,384,000	25,784,000	1,100,000	19,280,000	40,800,000
1873	72,855,000	72,855,000	27,100,000	1,200,000	20,400,000	43,600,000
1874	74,401,000	74,401,000	27,100,000	1,200,000	20,400,000	43,600,000
1875	80,880,000	80,880,000	27,100,000	1,200,000	20,400,000	43,600,000
1876	80,880,000	80,880,000	27,100,000	1,200,000	20,400,000	43,600,000
1877	85,721,000	85,721,000	27,100,000	1,200,000	20,400,000	43,600,000
1878	75,420,000	75,420,000	27,100,000	1,200,000	20,400,000	43,600,000
1879	75,420,000	75,420,000	27,100,000	1,200,000	20,400,000	43,600,000
1880	84,504,417	84,504,417	27,100,000	1,200,000	20,400,000	43,600,000
1881	84,504,417	84,504,417	27,100,000	1,200,000	20,400,000	43,600,000
1882	92,312,612	92,312,612	27,100,000	1,200,000	20,400,000	43,600,000
1883	92,312,612	92,312,612	27,100,000	1,200,000	20,400,000	43,600,000
1884	92,312,612	92,312,612	27,100,000	1,200,000	20,400,000	43,600,000
1885	92,312,612	92,312,612	27,100,000	1,200,000	20,400,000	43,600,000

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, \$36,979,729; from Marseilles, \$1,067,220; from Venice, \$726,000; from San Francisco, \$17,337,000. Total, \$56,109,949, as against \$55,617,578 last year. Pounds sterling estimated at \$4.84.

In presenting the above statement Mr. Valentine observes that the facilities afforded for the transportation of bullion, ores, and base metals, by the extension of railroads into mining districts, increase the difficulty of verifying the reports of the products from several important localities; and the general tendency is to exaggeration when the actual values are not obtainable from authentic sources; but the aggregate result, as above shown, may be relied on as approximately correct.

Mining in California the Past Year

Has, with the exception of hydraulic operations, been actively and successfully prosecuted, the business having been in a healthy condition and the season generally favorable. A light fall of snow the preceding winter on the mountains where the supplying rivers have their sources caused an early shortage of water, the streams commencing to fall more than a month earlier than usual, and failing entirely in many places long before the advent of the winter rains. Not more than once or twice before since mining was carried on in California have the rivers been so low as during the past

autumn. As a consequence, such of the hydraulic miners as are still allowed to prosecute their calling had a short working season, while many of the quartz mills which depend on water for their motive power were compelled to hang up a portion or all of their stamps before the summer was ended. Since the partial suspension of hydraulic washing much of the water formerly used for that purpose has been employed for the propulsion of quartz crushing machinery, the number of stamps now run by water being larger by twenty per cent than it was two or three years ago. What was lost to the hydraulic and quartz miners through this insufficient water supply was made up in part to the river-hed miners, whose success depends mainly on the occurrence of a low stage of water early in the season, and its uninterrupted and long continuance afterwards—conditions that were very fully met the past year. The timely and abundant fall rains having afforded plenty of water, both hydraulic piping and quartz crushing having been resumed some two months ago have since been in active operation, the prospect for a good water supply being at this time favorable.

Exploration and Discovery.

The year under review, without having been marked by any discoveries of special significance or of a startling kind, either here or elsewhere, has, nevertheless, been characterized by a number of mineral finds of considerable importance. Towards the end of 1884 a number of small quartz veins, some of which carried a good grade of surface ore, having been discovered in the New River District, Trinity county, caused quite an emigration to that region early in the following year. So disappointing, however, did the whole business prove that of the two thousand adventurers that visited the district, scarcely a hundred remained by the end of the summer. Those going to work have demonstrated that New River, though far from being what was at first expected, possesses no small degree of merit, several of the veins there on being opened up yielding a high grade ore in moderate quantities. Two small mills and several arrastras have been run on this ore the past summer with profitable results, and there is little doubt but New River will become a lively and popular camp in the course of a year or two.

In the neighborhood of Sierra City, for more than thirty years a prominent mining district, several important quartz finds have occurred of late, some of which have already been developed into largely productive and valuable mines. The same has occurred also in the vicinity of North Columbia Hill, an old hydraulic camp on the San Juan divide, Nevada county. Here, until about 18 months ago, no attention whatever had been paid to quartz, though many auriferous lodes were known to exist in that neighborhood. The closing down of this hydraulic mines throwing many men out of employment, led to a more thorough examination of those deposits, nearly all of free gold in the croppings. One of these lodes, the Delhi, coming into the possession of energetic parties, was equipped with an eight-stamp mill, which, commencing operations in the month of March last, has since been running on \$15 ore, mined and milled at an expense of less than \$3 per ton. Out of the net earnings made the owners of this mine are said to have reimbursed all expenditures, purchase money, cost of mill, extensive tunnelling and other improvements included and realized many thousand dollars in dividends.

A large body of the above class of ore having been opened up in this mine, the owners are about to erect a 20 stamp mill, for which there has already arisen an urgent necessity, considerable quantities of pay ore having accumulated on the dumps of ledges being prospected nearby. According to report there are at least a dozen quartz veins in the district that make fully as good a surface showing as did the Delhi and it seems altogether likely that this section of the San Juan ridges will in the course of another year become a very important quartz mining center. What strengthens this probability is the fact that these veins improve in a very marked manner under exploration, the Alaska, one of the best paying mines in the State, being on the same mineral range with these new locations, which extend northwardly to the grounds of that company. Already all the outcroppings lodes in the district have been taken up and it is expected that with the opening of spring, if not before, the work of development and ore extraction will be extensively engaged in, a good deal being already in progress. In every instance these ledges can be exploited to a vertical depth of 1200 feet by means of tunnels run in upon them from the canyon of the Middle Yuba river which cuts the entire series at right angles. Between the several large ditches that traverse the San Juan divide and the flow of the Middle Yuba, water ample for the propulsion of thousands of stamps can be obtained here at little cost.

The Older Districts.

In a number of the other old and populous districts of California gold bearing veins of greater or less apparent value have been found during the year, awakening additional interest in this branch of mining, and leading to the inauguration of many new enterprises in these several localities. Even in the more remote and thickly inhabited parts of the State the hardy and adventurous prospector has made important discoveries of both gold and silver bearing deposits of late. Along the western foothills and

on both slopes of the Sierra Nevada and out on the Mohave and the Colorado deserts deposits of this kind have been found, some of them evidently of great value; disclosing how little we yet know as to the extent of our metalliferous territory or the possibilities that exist for the almost illimitable expansion of our mining industries. Should exploration continue to reveal from year to year new resources in this direction, California will present a very ample as well as a safe and profitable field for the investment of outside capital. While it is true that the most of these desert localities are badly situated as regards supplies of wood and water, it is likely that the extreme richness of the ores found there will go far towards compensating for these disadvantages. The construction of railroads, several of which already traverse these desert regions, will ultimately afford facilities for taking in lumber, fuel and other supplies, and for shipping out bullion and ores, while artesian boring will in most cases procure all the water required for mining purposes, the trials made to this end having been attended with a good degree of success. That a great wealth of gold and silver will, in the course of time, be developed and prosperous mining communities grow up in these remote and wilderness lands may be regarded as a certainty.

Work Resumed and a Starting Up All Round.

While so much has been accomplished in the way of discovery, the year 1885 has seen a more general reworking of old and partially abandoned mines, and the starting up of more idle mills than any of its predecessors; such procedure having been made possible by the more perfect processes and machinery introduced, and the great advances lately made in every department of the business. Ores that 20, or even 10 or 12 years ago, were rejected as being too low grade to warrant handling, are now being worked with profit; hence, the value that now attaches to deposits formerly considered worthless. While this process of rehabilitation has largely obtained in the older and more central mining camps of California, it has, at the same time, been extended to some of the outlying districts, having reached as far off as Inyo county and other regions beyond the Sierra, where several idle mills and smelters have been started up, and ore extraction resumed on mines that have been neglected for years. For the same reason that work on the poorer class of mines has been resumed there has come to be some sorting over of the old dump piles with a view to picking out such ore as under these later economies and improved methods will pay for reduction. In a number of localities the tailings from the hydraulic and other placer mines are being reworked, in some instances on a large scale, and always with profit. These deposits are very extensive in California, and will yet become a source of large bullion production. With the appreciation of mines of small and formerly of doubtful value, the right to comparatively few claims is now suffered to lapse for want of the legal amount of work being done upon them. The relocating of claims is, therefore, every year growing less and less. Returning now to the subject of

Quartz Mining in California.

It may be remarked that Nevada, Pacer, Sierra, El Dorado, Amador, Calaveras, Tuolumne and Shasta counties continue to be, as they have always been, the sites of greatest activity in this branch of mining. While such is the case, there has still been more than the usual amount of work done in the other mining counties of the State. In no preceding year have so many new quartz mills been put up. While the most of these have been equipped with stamps, quite a large proportion has consisted of the several new styles of crushers, in which stamps are dispensed with. For prospecting purposes and the working of small mines, a good many arrastras are being employed, the tendency in California being toward an increase of these machines, most of which are run by steam or water power, chiefly the latter. Besides the erection of new mills, some of the old ones have had their capacity increased or have undergone such repairs as have added much to their efficiency, the entire ore reduction capacity of the State having been enlarged to the extent, perhaps 10 per cent during the year.

Through the constant introduction of new and improved implements, machinery and processes, and a better acquaintance with the business generally,

The Cost of Mining and Milling Ores in California.

Is undergoing steady reduction, being less now by nearly one-half than it was only a few years ago; as this cost varies widely with varying conditions it is difficult to arrive at a general average, though this does not probably much exceed \$5 per ton. The following examples scattered over the more central mining counties of the State will tend to illustrate this point. The Idaho mine, near Grass Valley, Nevada county, equipped with a 35-stamp mill run by water, crushed during the year 1884, 31,143 tons of ore that yielded \$18.04 per ton; cost of mining and milling, \$7.86 per ton. During the past year the yield of the ore has been somewhat more, while the expense was about the same. The Delhi mine, on the San Juan divide, same county, 8-stamp mill, water power; yield of ore, \$14 per ton; cost of mining and milling, \$2.50 per ton; daily crushing, 20 tons. The Alaska mine on the same quartz range with the Delhi, but two miles to the north of

it, being in Sierra county, outfitted with a 20-stamp mill, which crushes 35 tons per day; yield, \$25 per ton; cost of mining and milling, \$6.75. The Sierra Butte mine, same county, two mills—aggregate 90 stamps—crushed last year 30,000 tons of ore; average yield, sulphurets included, \$6.47 per ton; cost of mining and milling, \$1.30 per ton. The young America mine, situated near the Sierra Butte, 8-stamp mill, driven by water, crushes 15 tons per day; cost of mining and milling, \$4 per ton; yield, \$60 per ton. Plumas-Eureka mine, Plumas county, 60-stamp water mill; ore yields \$7.27 per ton; cost of mining and milling, \$4.32 per ton. Grand Victory mine, near Diamond Springs, El Dorado county, 50-stamp water mill, crushes 225 tons per day, at a cost for mining and milling of 75 cents per ton, the ore yielding about \$2 per ton. This mine is worked after the manner of an open quarry, the vein being of large dimensions and the ore soft and easily crushed. At the Josephine mine, same county, the ore is mined and milled at a cost of only about one dollar per ton, the mill being propelled by water. The ore at the Plymouth mine, Amador county, is mined at a cost of \$3.20 and milled at a cost of 48 cents per ton, the cost of saving and reducing the sulphurets being 21 cents per ton. The company have two mills, the one carrying 80 and the other 40 stamps, both being driven by water. About 80,000 tons of ore are crushed here per year; yield, \$13 per ton. At the Zeile mine, in this county, the 40-stamp mill run by water crushes about 120 tons per day, which is mined and reduced at a cost of \$2 per ton. The ore here is low grade, yielding only \$4.50 per ton; about one-half of this consists of free gold, the balance being in the sulphurets, which are worked on the ground by the chlorination process. The average cost of mining and milling gold-bearing quartz in Amador does not exceed \$4 per ton, treatment of sulphurets included, a good many of the mills here being propelled by water power.

Southern California Mines.

It is only within the past few years that the mines in what is known as Southern California have made any very good showing. The old Julian, Banner and Cuyamaca mines in San Diego county, which created so much excitement in 1870, worked for a few years, and then did little for a long time, are again being worked. But the greatest advance has been in San Bernardino county, which is now a splendid bullion producer. The outlook there is now even better than a year since. The Calico Print says:

The principal mines in Calico, the best silver-producing camp in the State, have been in constant operation during the past year. Four mills in the vicinity of this camp have been in almost constant operation, besides the Waterman mill which crushes about 20 tons a day of Calico ore. The Silver King, Garfield, Occidental, Thunder, Bismark, Gobbler, Silver Odessa, Snow Bird, Waterloo, Sue, Red Jacket, Blackfoot and Mountain Brow, have all been yielding a generous supply of ore, and each mines as the Plutarch, Last Chance, Cuba, Josephine, Sam Houston No. 1 and No. 3, Lyon, Alhambra, Golconda, Kearee, Dora Belle, Humburg, Exchequer, are looking well, but have not been developed on a large scale. The prospects of all these are such as to inspire a reasonable hope that they will yet develop into extensive and rich properties. But little money has been expended on these mines, and those that have not paid dividends, have at least paid expenses, with few exceptions. During the year 1886 the principal mine will be worked on a larger scale than ever, which will necessitate more mills and more men to work in the mines, and result in increased activity and prosperity. The Waterman mine looks as well as ever and keeps about ten stamps in constant operation. The Alvord gold mine is a fine property and turning out daily tons of ore that will yield a handsome profit.

The prospects of the gold mines in Butte Valley are bright, and the gold placer mines near "Old Baldy" Mountain are being worked on a more extensive scale than ever. The gold mines at Kramer are looking better as depth is attained. The gold prospects near Old Woman's Springs are turning out some very rich rock. The silver mines at the Lava Beds are looking up again on account of new and rich strikes. The Soda Lake mines are attracting attention on account of rich developments. The mines of Ivanpah and vicinity are looking well. The Providence mines are as rich as ever, and it is expected that a new mill will be built ere long, a large force of men be employed, and the camp be in a more flourishing condition than ever. The prospects along the Atlantic and Pacific Railroad are beginning to look as though they may develop into valuable mines. In fact, the general mining outlook is very encouraging, and, in fact, we are just entering a year of unprecedented prosperity for the mining districts. The mineral bearing portion of this desert is very extensive, and the present bright outlook is simply a beginning of the brilliant future that awaits the industrious and patient miner and prospector. It is a mining country that is quietly advancing on its own solid merits, and not impelled furiously along by fictitious "booms," like the vessel in the storm, that finally collapses on barren rocks.

In Los Angeles county there is some little placer mining going on north of Newhall and along the old road to Bakersfield, but water is scarce. The same auriferous gravel belt runs

some 15 miles down the east side of the Santa Clara over into Ventura county. A Rhode Island company is now building a seven-mile ditch to bring in water.

The Oil Belt.

In both Los Angeles and Ventura counties there are immense deposits of mineral oil now being developed. The known and prospected fields of Southern California commence at the Pico canyon, six miles west of Newhall, on the S. P. R. R., and follow a course a little north of west into Ventura county, and as far as Santa Paula, a distance of some 40 miles, and to the southeast of Los Angeles, in the Puente hills. A recent strike places beyond a doubt the existence of a valuable oil field in that section of the county. A number of wells are now producing, and the yield of petroleum is annually increasing. There has been a good deal of activity during the year, considerable quantities of the crude oil having been raised and refined, mostly by the single large company operating there. This company has just completed a 63-mile pipe for conveying the crude oil from their principal wells to the seashore, where it will be loaded on vessels and taken to their refinery at Alameda point, opposite the city of San Francisco. The business of gathering and refining these earth oils promises to become one of the paying and permanent industries of the country. In 1884 about 8,000,000 gallons of petroleum were manufactured in this State, the quantity made last year having been much larger.

The Northern Part of the State.

Trinity county has done fairly well in the past year. The bullion shipments from Weaverville alone for 1885, by Wells, Fargo & Co.'s express, were \$191,655. The Trinity Journal says: The mining outlook—and upon the mines depends the business prosperity of the county—is excellent at this time. Already more has been done in the hydraulic mines than was accomplished all of last season, and it now seems certain that the gold yield of 1885-6 will be greater than for any season for many years past. The weather has been most favorable, and work has been done at little comparative expense; accidents incident to a miner's life have been very few and the damage to ditches and other mining property very slight indeed. The opening and development of older quartz mines, the discovery of new ones and the building of mills and working of quartz on an extensive scale has opened up an industry which pays largely and until within the past few years was unknown in this county. While quartz mining here may yet be said to be in its infancy, enough has been done in that direction to demonstrate beyond question its permanence, and give assurance of dividends far beyond the lifetime of the present generation. With the coming of spring the hills will again swarm with prospectors, and we confidently expect to chronicle many rich strikes in quartz during the ensuing year.

There has been considerable attention turned to Shasta county during the past year and there has been a great deal of prospecting done. The Shasta County Democrat says: We have taken the trouble to visit several camps of late, and we are convinced from what we have actually seen that the ultimate mineral development is possible of greater achievements than we have heretofore anticipated. Quartz mining in this county, legitimately, is comparatively in its infancy. The mineral exists and capital, always timid, is yet bound to take hold and invest. The surface prospects alone of one camp—Squaw creek—is simply wonderful, and if honestly described in a newspaper article would be doubted, simply because it would appear incredible. But gradually men of capital will be drawn hither, and they will then see for themselves. It will take money to develop many fine prospects, especially on Squaw creek, but a couple of days' investigation will completely satisfy any mining man that the gold is there to warrant any reasonable expenditure of money in roads and milling machinery necessary to make dividends. No country was ever found more handsomely situated for deep and cheap development, and for wood and water privileges. Bullychoop is improving every day and the new milling facilities that are to be erected there as early in the spring as possible, is certain to give a great impetus to development in that camp. Deadwood and French Gulch are improving rapidly, and new discoveries of value have lately been made in both those districts. Development of a permanent character has just begun, and as regards Squaw creek there is enough ore on the surface to warrant the erection of mills. Altogether the outlook is most propitious, and it is certain that before this time next year remarkable developments will be made and capital will be seeking investment to a much greater extent than heretofore.

In Siskiyou county the quartz river creek bank and high gulch claims give employment to many persons. Quartz mines abound along the southern boundary of the county, adjoining the New River district of Trinity county; also, on Salmon river, further north, and all its tributaries, in which the noted Black Bear and Klamath mines have each a 32-stamp mill. On Scott river—from its junction at the Klamath to the mountains adjoining the Shasta and Trinity boundary—good quartz, placer, bank and hydraulic mines exist; also on McAdame, Indian creek, Cherry creek and Deadwood, north of Scott valley. In the vicinity of Yreka quartz mines exist in the Humboldt range, which

is a continuation of the Salmon range, and continues to Cottonwood and Siskiyou mountains, several good ledges being located at Cottonwood. The Klamath river about 15 or 16 miles north of this place, is also mined nearly its whole length in this county by means of wing-dams, with current wheels to work the derricks, pumps, electric lights, etc., while huge dip-wheels raise water for the sluices. In all these ditches along the southern and western line of the county all other kinds of mining are carried on extensively. Besides the gold mines there are cinnabar, iron, coal and other mines; also quarries of superior marble, stone, onyx, etc.

In Butte county there is considerable work going on. The Oroville Register has an extended review of the situation in the county. At Mountain House Ridge, several mines are being opened and some arrastras are running. The famous Big Bend tunnel has been driven ahead 3560 feet during 1885, making the total distance completed to Dec. 21, 1885, 10,852 feet. They expect to complete the tunnel in April, when they will turn the water into it out of the river and mine the river bed. Some 75 men are at work for the company. The Golden Drift and the Black Channel are two other companies at work. Five or six companies are successfully mining at Kimsbaw, taking out gold. On the Magalia ridge considerable good gravel is being mined. On Middle Butte creek fine pay gravel has been struck by Wiley Bros., Dean and Collins, and considerable gold is being taken out. The Mineral Slide Company expect to spend \$15,000 more before they reach the pay channel. The Cole claim is in rich gravel. On Gravel run, Carr & Co. have gravel some of which runs as high as \$10 to the carload. The mining developments of the county for 1885 are very flattering and more work has been done than during the preceding five years. Next season promises to be the best mining year that Butte has seen for the past quarter of a century.

In Mariposa county the Mariposa grant is out of litigation and may at any time cease to be a drawback to the mining interests of the county. Experts have lately examined the Cooke property, at Conterville, and "the people of that section hope to soon see the mines in operation. The Hite mine is again the property of John Hite, the original owner, and it is hardly probable that it will remain idle for any great length of time. The Cranberry, Red Cloud, Banderita, Vanderbilt, Francis, Diltz, Quartz Mountain, Early, Buena Vista, Stick-in-the-Mud, and a score of other mines, will do their part toward supplying the world with a circulating medium.

Hydraulic Mining.

Of the hydraulic mines which within the past two or three years have been enjoined from running or which shut down through fear of such procedure, several have since resumed operations the owners having so far taken care of their tailings that their action has been considered a reasonable compliance with the requirements of the courts. This has been effected in some cases through the construction of retaining dams and in others by raising the debris by means of hydraulic elevators and returning it to the washing pits or depositing it in other receptacles and there retaining it till the coarser and more objectionable portions have settled, a plan that has been found to answer a very good purpose in the few instances where it was practicable, the trouble with most companies being that they have not enough water to dispose of their tailings in this manner, nor is it possible in all cases to find suitable places for their reception. It takes as much water for feeding one of these elevators as for piping off gravel, and it is not often that so much water can be spared. As a good many companies lack also natural facilities for building impounding dams, it happens that only a small proportion of the entire number enjoined have yet found means to so effectually dispose of these mining slums as to satisfy the anti-debris people or fully meet judicial requirements. And so this vexatious question between the farmers and the miners remains not only unsettled but continues a source of constant irritation and ill-feeling between these two classes, the miners complaining that their opponents persecute them unjustly and the farmers charging that the miners persist in operating their claims in violation of the injunctions issued against them.

In Trinity, Del Norte and Siskiyou counties, occupying the northwestern angle of the State, where hydraulic mining has not been interfered with by the courts, the business has been carried on as usual the past year, the working season having been curtailed somewhat by reason of a short water supply. The seasonable and abundant fall rains having filled the ditches, the hydraulic miners got to work in good time, and having since had favorable weather have to date been doing tolerably well. With a heavy snowfall thus early on the mountain an ample supply of water next spring and summer is assured, which, in California, means a golden harvest for the hydraulic miner.

Drift Operations.

With the closing of so many hydraulic claims increased attention has been given to drift operations, imparting, during the past few years, quite an impetus to this branch of mining in California, where it is now being extensively pursued and, for the most part, with favorable results, the mistakes so common in former years being now generally avoided. The counties most noted for drift diggings are Placer,

Calaveras, El Dorado, Butte, Nevada and Sierra, the most active localities consisting of the Slate Creek basin and the Bald Mountain district, Sierra county; the vicinity of You Bet, in Nevada county, and the Forest Hill divide, in Placer county, in each of which a number of largely productive and profitable claims are being worked. A large proportion of the gravel taken out at the Breece and Wheeler and at the Mayflower mines, on the Forest Hill divide, requires to be crushed with stamps, which is also the case with some of that extracted elsewhere. Where this method of treatment becomes necessary, the expense of handling is much increased, but this class of gravel is always correspondingly rich in gold. Thus, the gravel taken from the Mayflower mine yields on an average \$20 per ton, this being from six to eight times as much as is contained in the ordinary grade. The Breece and Wheeler claim is yielding at the present time nearly as rich material as the Mayflower. The number of men employed by the larger drift companies, varies from one to two hundred. Many claims, however, are worked by small companies, consisting of five or six partners. In several instances this class of operations are being carried on with signal success by companies of practical miners, associated together for the purpose. Formerly many Chinese were employed by the drift companies; but of late they have been almost wholly replaced by white men. Very few Chinamen, in fact, are any longer employed by the white miners in California, though some ten or twelve thousand of them are at work in the California gold fields on their own account. As but little water is required for drift operations, this class of miners were not seriously inconvenienced by the low stage of water the past summer, it being their practice to store their gravel in dump yards, and when they have not water for frequent washings, hold it until the supply becomes more plentiful. The drift mining interest in California is at the present time in a fairly prosperous condition, with a favorable outlook before it. The deposits adapted to be worked by this plan are very extensive, the beds of the "Dead Rivers," in which the most of them rest, covering a linear extent of several hundred miles, of which not a tithe has yet been exhausted.

River Bed Mining

Is still pursued on an extensive scale in California, the Scott, Salmon, Klamath and Feather rivers constituting the sites of the principal operations of this kind now carried on. On the Klamath and Scott rivers the business is pursued on a large scale and in a systematic manner, some of the claims there having been worked for many consecutive years. The low stage of water in the rivers last year and its prolongation well on into the fall, greatly favored this class of miners, the most of whom, as a consequence, gathered from their claims more than the average yield of gold. More than half the river-bed miners in California are Chinamen, with whom this is a favorite style of mining, for the reason that, practiced after this manner, it requires no great outlay of money and is pretty sure to prove fairly remunerative, with the chance of occasionally yielding large returns. In prosecuting this business these people do not, after the manner of the whites, often turn the water of the river entirely from its bed, but merely reclaim a portion of the latter by wing damming, a comparatively inexpensive procedure. River-bed mining, after suffering a marked decline, has for several years past been on the increase in this State, being now carried on to a greater or less extent along every considerable stream that traverses the California gold fields. As a general thing the Chinese lease their claims from the whites or rework portions of the river beds that, having in former years been worked over, have been abandoned by others, this class of deposits having a tendency to slowly reproduce themselves.

Silver Mining.

Not until the discovery of the Comstock lode in 1859, ten years after the gold fields of California began to be actively worked, did the miners of this State begin to prospect for silver bearing ores, or pay any attention to that branch of mining. Although the first discovery of silver lodes in California occurred in Alpine county in 1861, not until 1872 did this metal begin to be turned out in any quantity, the first considerable production made being from the Cerro Gordo mines of Inyo county, which that year turned out about \$750,000, this sum having been gradually increased until 1877, when the amount produced amounted to \$3,000,000. From 1877 the production steadily declined until 1882, when this decline was arrested through the output of the Calico and other mines in San Bernardino county, the silver product of that State having been estimated at \$1,500,000. In 1883 it was advanced by a million and in 1884 by another million, amounting to \$3,500,000. The product for 1885 may be set down at \$4,000,000, a rate of production that can probably be kept up and may possibly be advanced for several years to come. Three-fourths of all the silver taken out in the State comes from the various districts in San Bernardino county, the balance mostly from Inyo county, where the business of mining for this metal has undergone considerable improvement of late. In San Bernardino county it is also represented to be in a generally prosperous condition with encouraging prospects ahead.

Quicksilver Mining.

The following table shows the receipts of

quicksilver at this port from the various mines during 1885, as compared with 1884, showing the total by months:

Months.	1884.	1885.
January	1,901	2,483
February	2,100	2,316
March	3,210	2,262
April	3,464	2,836
May	2,117	2,793
June	1,730	2,713
July	2,611	2,694
August	1,843	3,047
September	1,129	2,978
October	2,506	2,465
November	2,704	2,408
December	1,929	2,827
Totals	27,294	31,865

Showing an increase of 4571 flasks during 1885.

In 1883 the receipts were 47,365 flasks.

The shipments by sea and overland for a series of years were as follows:

Year.	By Sea.	By Rail.	Totals.
1885	15,514	*	*
1884	14,806	7,000	21,806
1883	33,247	4,640	37,887
1882	34,771	5,702	40,473
1881	35,264	10,534	45,798
1880	34,633	11,940	46,573

*Returns incomplete.

The following table shows the production of the principal and all the other mines in the State by months, with the totals, and the highest and lowest price paid per flask during each month of 1885:

MONTHS.	New Almaden Mine	Other Mines in California	Total Flasks	Lowest Price.	Highest Price.
January	1,700	783	2,483	\$34 50	\$33 00
February	1,506	810	2,316	32 50	32 50
March	1,500	762	2,262	31 00	32 50
April	2,003	813	2,816	30 00	31 00
May	2,003	793	2,793	28 50	29 00
June	1,750	963	2,713	29 00	30 00
July	1,750	944	2,694	29 75	30 00
August	2,104	943	3,047	29 50	29 75
September	1,930	1,042	2,978	29 50	30 50
October	1,598	870	2,468	30 00	30 50
November	1,570	892	2,462	29 75	30 00
December	1,977	850	2,827	30 00	32 00
Totals	21,400	10,465	31,865		

Of the total production of 31,865 flasks it will be noted the New Almaden mines produced 21,400 flasks, or about 67 per cent of the whole.

The Guadalupe mine yielded thirty-five flasks, and then entirely ceased operations. The several other small mines operated evidently did not pay for working out what little ore they had to produce 10,465 flasks, which was 1,448 less than their yield in 1884.

The continuance of low price for the metal causes all the quicksilver mines in the State to be worked "for all they are worth," and the present prospects are good for the early exhaustion and closing of nearly all the mines now producing. No new discoveries of quicksilver-yielding ores have been made for the last five years, and the probabilities are that the bodies at present worked are all the deposits of ore in paying quantities that exist in the United States. When they are worked out and the silver and gold mines of the United States are compelled to buy quicksilver (without which their ores cannot be worked) from the Governments of Spain and Austria, who will then own the only source and supply of quicksilver, it is likely that the silver question will assume an entirely new phase, for the few owners of quicksilver will have the power to control and limit the production of any and all the gold and silver-producing mines of the entire world. To put quicksilver at a price of \$1 a pound would soon shut up many silver mines yielding low grade ores, and it is possible that the control of quicksilver could be so managed as to prescribe to what mines should be permitted to purchase the quantity needed for working their ores.

The exports this year amounted to 15,514 flasks, valued at \$478,827, 618 flasks in excess of last. Australia did not take any from us during 1885. There were 100 flasks exported to that country in 1884. The greatest gain to any one country during 1885 was to New York, the exports being 9,055 flasks, as against 8,350 in 1884, an increase of 705 flasks.

Coal and Iron.

Coal has been rather depressed during the past year. The amounts imported in 1884 and in 1885, are strikingly similar. J. W. Harrison's circular gives the following figures as showing the various sources whence we received our supplies:

Collieries.	Tons.
British Columbia (Wellington and Nanaimo)	224,228
Australia	200,751
English and Welsh	170,656
Scottish	20,228
Eastern (Cumberland and Anthracite)	29,534
Seattle	75,112
Carbon Hill	157,245
Green River, Cedar River, Mount Diablo	71,611
Renton, Newport, South Prairie	67,004
Totals	1,023,330

The arrivals at Wilmington are computed in the above figures.

It is to be hoped that this year may prove remunerative to investors in our coast collieries. The experience of the past year should be beneficial to our local managers; low prices increase consumption but little, and certainly present quotations can leave but small profits on the large amount invested.

The importations of foreign coke this year

have been 20,611 tons, as against 10,695 in 1884. The major portion of this is shipped inland for smelting ores—as English and Scotch coals are especially adapted for this purpose.

As to iron, it was generally supposed about a year since that the Clipper Gap, Oregon and Puget Sound furnaces would produce more than sufficient for the requirements of the coast; they have the capacity and material, but cannot market their products profitably, when American at \$21.50 and Scotch at \$22.50 per ton are the competitors.

The figures show our stock on hand to be 3375 tons less than last year at this time, yet 935 tons greater than the average stock for the past five years at this time. The stock on hand and en route, together with the promised return of the Clipper Gap furnaces for the next six months, insures consumers against any scarcity in the near future.

The present stock on hand consists of 13,459 tons, of which 8150 tons are British, and 5339 tons are Eastern and home manufacture. There are 3943 tons in the firsthands, and 9546 tons among consumers.

Foundrymen are hopeful of a material improvement this year over the last, as several extensive improvements are being figured on, which will consume considerable iron, and it is anticipated a number of quartz mills will be erected in the spring, which will aid materially in enlivening this branch of trade.

Other Mineral Products.

There are many other mineral products of California which are profitably worked. We produced last year about 5,000,000 pounds of borax, 30,000 tons of salt, some little lead, probably 1000 tons of copper, etc. The chrome iron industry is a profitable one. Among our other mineral products are antimony, asbestos, asphaltum, bismuth, building stone, cement, clays, coal, graphite, gypsum, manganese, mica and sulphur. Some of these are utilized, while with others very little has been done.

Dividends.

It is a mistaken idea to take the published list of dividends of mines for the total mining profits. Only those mines are put on the list as published, which are incorporated or are "called" on the stock board. But there are hundreds of others which are paying properties, which never come before the public. The following statement by the *Bulletin* shows dividends paid (mostly in San Francisco) by mining companies in 1885.

Dividends	Amount.
Bodie Consolidated	1 \$33,466
Derbec Blue Gravel	3 30,000
Father De Smet	12 240,000
Caledonia (Dakota)	2 20,000
Honestake	13 525,000
Idaho	12 200,000
Jackson	3 15,000
Ontario	12 900,000
Plymouth Consolidated	12 575,000
Plumas Eureka	2 105,408
Silver King	8 200,000
Synthetic	2 20,000
Sierra Butte	2 30,000
Bird's Eye Creek	2 15,000
Mt. Diablo	3 30,000
Navajo	2 50,000
Richmond Consolidated	1 62,500
Totals	93 \$3,069,550

This is a list of only 17 companies. None of the producing mines of San Bernardino county are included, none of the paying Sierra county drift or Shasta quartz mines, and only one Nevada county and one Amador county mine. The mines owned by private companies, or by individuals do not publish their dividends, so that the list is misleading. In 1884 there were 23 companies on the list corresponding to the above, the aggregate dividends of which were \$3,555,738.

Gold and Silver Coinage.

The coinage of the U. S. Mints for 1885 was as follows:

Double Eagles	\$13,875,560
Eagles	4,815,270
Half Eagles	9,065,000
Three Dollars	2,730
Quarter Eagles	2,217
Dollars	12,205
Standard Dollars	23,669,767
Half Dollars	3,065
Quarter Dollars	3,632
Dimes	257,712
Five Cents	73,825
Three Cents	143
Cents	117,655
Total	\$56,863,811

The coinage for the last month of 1885 was quite large, amounting to \$7,253,111, of which \$4,699,364 was in gold, mostly in eagles and half eagles, \$2,549,611 in silver, mostly in dollars, and \$9136 in bronze, mostly in cents.

The coinage for the past year may be classified as follows:

Gold	\$27,773,012
Silver	23,934,176
Minor	191,623
Total	\$56,808,811

The coinage of base metal pieces last year was the smallest in many years. More than double the amount of eagles was coined last year as compared with 1884, while the coinage of half eagles was more than four times larger. The half eagle is a popular coin in the East, but California bankers prefer the double eagle, because more easily and safely handled.

PEOPLE living up in Modoc and other mountain regions have a difficult time now communicating with the outside world on account of the rough roads.

ARIZONA

Arizona during the past year has not made as much progress as was expected of her.

There have been many discoveries made, and a good deal of prospecting has been carried on, but the older and better developed mines have not been able to turn out as much bullion as was hoped. The Tombstone mines have been troubled with water; and the low price of copper has retarded the growth of the copper mining industry. Quijota district has been producing but three months, the Vekol six months, while several producing mines in Pinal, Gila and Yavapai counties in 1884 have been idle during last year, and the Verde and others of Yavapai county have not been operating during the year. Pima county has made the greatest advance in mining during the year, especially so in the business of ore shipment, Harshaw and Pima districts being the principal chloriding camps.

The Tucson *Star* has collected as far as possible, the statistics of production and put them in concise form. That journal says:

The bullion statistics given below are all, save one, official, and although strenuous efforts were made to secure full returns, several producing mines have not been reported. The total silver bullion produced, so far as heard from, including concentrates and ore shipments, amounts to \$4,502,875.47, and gold bullion, \$282,614.03, making a total of \$4,785,390.50, being nearly \$2,000,000 more than was officially stated for 1884. To this can be added for 1885 at least, \$1,500,000 not reported.

The following tabulated statement, officially reported, will give some idea of the importance of the silver and gold products for the past year:

GOLD BULLION.	
Grand Central	\$ 45,342 03
T. M. & M. Co.	2,3 00
Dos Cabezas	34,000 00
Yuma county	22,100 00
Shipped through Tucson Express office	118,872 00
Arizons Central (estimated)	60,000 00
Total	\$ 232,614 03

SILVER BULLION.	
Grand Central	502,735 60
T. M. & M. Co.	429,744 00
Contention Con.	207,173 87
Peerless Mining Co.	108,964 00
Jessie Benton	62,568 60
Silver King	815,370 00
Vekol	240,000 00
Chp.	176,180 00
Concentrates from Maricopa	22,750 00
Concentrates from Benson	12,600 00
Total	\$2,671,285 47

Chloriding.

One of the most important features of the mining industry during the year has been the development of chloriding, which is fast becoming a permanent and profitable industry. The *Star* has received reliable returns from the points of shipment, which show that Northern Arizona has shipped out of the Territory 3279 tons per the A. & P. R. R., and Southern Arizona has shipped per the S. P. R. R., 8931 tons. The total shipment being 12,210 tons, tabulated as follows:

From	Tons.
Crittendon	1,353 1
Tucson	3,222
Maricopa	3,734
Casa Grande	126 1
Wilcox	122
San Simon	47 1
Pantano	26 1
Picacho	10
Yuma	10
Mohave county	3,279
Total	12,210

The average value of the ore shipped is over \$150 per ton, which gives an ore shipment of the sum of \$1,831,500, which shows the importance of the mining industry.

SUMMARY.

Total gold product	\$ 282,614 03
Total silver product	2,671,285 47
Total value ore shipped	1,831,500 00
Grand total	\$4,785,390 50

The copper product of the Territory shows up well, considering the fact that several producing companies during 1884 were compelled to close down on account of the low price of copper and the high price of fuel. The product for 1884 was estimated at 27,000,000 pounds. The actual product for last year, as far as heard from, was as follows:

COPPER BULLION.	
From—	Pounds.
Bisbee	7,961,923
Clifton	10,680,500
Globe	4,904,420
Picacho	37,000
Casa Grande	37,000
Total	23,360,508
Market value, 11c per pound	\$2,569,655 88

LEAD.	
T. M. and M. Co., lbs.	1,456,009
Benson smelter, lbs.	3,413,360
Total	4,869,369
Value, \$60 per ton	\$146,040

RECAPITULATION.	
Gold and silver	\$4,735,333 50
Copper, value	2,569,655 88
Lead, value	146,040 00
Total value of all metals	\$7,501,029 38

COLORADO.

Colorado stills holds first place as a bullion producer, the great output of the camp at Leadville making such an addition to the general product as to admit of this. The recent discoveries at Leadville, to which we have before referred in the PRESS, show that this bullion product is not likely to fall off for some time to come. This gold belt of the State are said to be of large extent, and both lode and placer claims show evidence of richness. These deposits seem to lie on either side of the continental divide, and in the spurs and basins along its course. Beginning in Rio Grande county, they follow this Pacific slope through Gunnison, Pitkin, Eagle, and Summit counties, whith to the east, in Boulder, Gilpin, Clear Creek, Park and Lake, even into Chaffee county, small veins present themselves. Indeed, there is not a county in the State in which mineral deposits have been found where gold does not exist; but as the deposits of silver and lead have been so much larger and more accessible, mining has been principally confined to the latter metals and less attention has been given to a thorough exploration of the gold field.

In fact, just now Colorado is flattering herself that, having outstripped the other States and Territories in producing silver and lead, she will in a few years beat California in gold yield. This is hardly probable, however, for our California gold fields are well developed now, and our mines well equipped. Moreover, there is now more attention being paid to gold quartz mining than ever, and our drift mines are pausing out very well. In Clear Creek county Colorado, more gold is produced than ever before. The product of the Freeland mine was \$4 per cent gold—\$280,602.04; the H and W also produced considerable, these two mines turning out \$252,184—more than the entire product of some of the gold producing counties. The Elk Mountain Pilot gives the following mineral shipments from Crested Butte for the year ending, Dec. 31, 1885:

Where From.	No. of Tons.	Estimate Value.
Aspen.....	1,250	\$125,000
Forest Queen.....	460	60,000
Augusta.....	470	47,000
Bullion King.....	52	15,488
Ruby Chief.....	40	8,000
Excelsior.....	60	12,000
Miscellaneous lots.....	240	24,000
Total Shipments.....	2,572	\$300,480

Anthracite and bituminous coal are both mined there, and a great deal of coke is made. They shipped last year 46,690 tons of bituminous coal, 29,080 tons of anthracite, and 22,240 tons of coke. Total coal shipments, 98,010 tons.

In Gunnison county, the camps are spread over a large area. An estimate of the number of mines now worked in Gunnison county, counting only those that have shipped ore this year, and omitting the hundreds of prospects, many of them excellent, would be by districts as follows, according to a correspondent of the Denver Tribune-Republican: Irwin four, Crested Butte six, Gothic seven, Crystal five, Scofield three, Elko three, Tin Cup seven, Spring Creek two, Pitkin two, Tomichi five, White Pine six; total, fifty. Of these fifty mines about ten have yielded a greater output than all the others combined. They are the Sylvanite of Gothic, the Forest Queen and Bullion King of Irwin, the Augusta of Crested Butte, the Doctor on Spring Creek, Enreka and Lost Contact at White Pine, the Legal Tender at Tomichi, the Jimmy Mack and Gold Cup at Tin Cup.

There has been more actual mining and less speculating in the camps of the county during 1885, than any previous year in the history of the county. The completion of the smelter gives new life to the mining industry since many low grade mines can now work at a profit that could not pay freight over the Continental divide. Next season these prospects will become paying mines.

Concerning Dolores county, we quote from the same authority: The Grand View Smelting Company, the Pasadena Smelting Company, the Rico Reduction Company (lixivation and amalgamation) and the Santa Clara Amalgamation Works comprise the reduction works of Rico. The Grand View Company's works have been in operation a little over three months. They have reduced about \$160,000 of ore, and have over 600 tons in reserve, worth \$160,000 to \$175,000. Its average daily reduction is 25 tons, while the present daily shipments average 30 tons. The smelting plant cost about \$100,000. The Pasadena Company's works have been in operation fully two-thirds of the year. In round figures it has shipped bullion valued \$500,000. These works are now closed until the spring. The plant is worth \$75,000. The works of the Rico Reduction Company, which cost over \$100,000, made a run of two or three weeks and then closed down for the year. Five thousand dollars worth of bullion was the result. The Santa Clara has been idle during the year; plant worth, \$15,000.

During the past year many important developments have been made regarding the mineral resources of Pitkin county. The Aspen Times claims a production of \$4,500,000 for the county during the year.

The Register-Call gave the following as the output of Gilpin county for 1885:

Smelting ore, 12,940 tons.....	\$ 970,500
Bailing, 15,550 tons.....	388,750
Tank shipments of gold.....	914,925
Individual shipments.....	50,000
Miscellaneous.....	50,000
Total.....	\$2,374,175

The Idaho Springs Gazette claims a product of over \$3,000,000 for Clear Creek county alone. Many estimates of the production of camps and mines have been made, but many of them are exaggerated. As the Denver Tribune-Republican properly says: "Owners and shippers, in giving newspaper men information, are as apt to inflate values as the miner is to choose his richest rock for assay or mill sample. A mine's output, as gathered from owners, must be put through a severe shrinking process before it will tally with the records obtained from smelters. If we should accept the returns from individual districts and add them together the total would far surpass the bullion yield by all the smelting plants of the State. There is no denying the fact that very many counties have made rapid progress in mining work and gained largely in yield considering the shortness of the shipping season of 1885, but the receipts at the smelters do not substantiate the claims made as to the amount of increase. The mines of the State are, of course, better developed than ever, and the exposures of mineral are beyond that of any previous period."

The Idaho Springs Gazette claims for the district around that region a product of \$489,408.30 gold and \$354,019.30 in silver, lead and copper, a total of \$843,427.80.

The Mathews & Webb Sampling Works, which have been erected the last year, at a cost of \$10,000, purchased the following amount of ore:

Silver.....	\$250,620 00
Gold.....	170,238 00
Lead.....	20,119 11
Copper.....	2,546 88
Total.....	\$401,430 49

We have a number of mines in the district which are producing from \$1000 to \$5000 monthly. The outlook for 1886 promises to largely increase these figures. This shows what legitimate mining can do. Less than 400 men are employed in making this grand production. The output in gold shows conclusively that we have as much a gold district as we have silver. This year's output of gold will be largely in excess of last year.

The Georgetown Courier declines to make estimates of Clear Creek's output, but gives only such statistics as are obtainable. At the public ore market Messrs. Duncan & Wheeler purchased ore of an assay value of \$405,395. The weight of ore purchased by G. W. Hall & Co., containing silver, lead and gold, from Jan. 1, 1885, to Jan. 1, 1886, was 5,567,534 pounds, containing 605,404 ounces of silver. The assay value of the three above metals combined is \$648,201.22, taking the average price of silver for the basis to figure upon as \$1.05½ for the year.

The Miners' Sampling Works purchased ore to the amount of \$186,086 during the year. During the year there were 8,528 tons of ore shipped from the Georgetown depot, the mineral being valued at about \$1,200,000.

The Boston and Colorado Smelting Company made the following purchases during the year 1885:

Locality.	Gold.	Silver.	Copper.	Totals.
Gilpin.....	\$ 374,000	100,200	\$ 52,600	\$ 526,800
Clear Creek.....	154,600	450,000	38,400	643,000
Boulder.....	92,000	39,000	.....	131,000
Lake.....	75,000	75,000	.....	150,000
Summit.....	270,000	.....	270,000	540,000
Park.....	9,900	57,200	900	67,000
Gunnison.....	30,000	.....	39,000	69,000
Custer.....	2,000	4,000	.....	6,000
Hinsdale.....	1,300	4,000	3,700	9,000
Saguache.....	8,000	.....	8,000	16,000
Ouray.....	400	1,500	800	2,700
La Plata.....	14,500	8,000	18,000	40,500
Rio Grande.....	1,900	600	2,500	5,000
California.....	4,000	14,000	1,000	19,000
Nevada.....	85,000	120,000	1,000	206,000
New Mexico.....	30,000	40,000	9,000	79,000
Arizona.....	19,000	8,000	27,000	54,000
Utah.....	5,500	37,000	11,500	54,000
Idaho.....	11,800	1,200	13,000	26,000
Montana.....	01,000	500,000	240,000	741,000
Mexico.....	2,000	22,000	4,000	28,000
Miscellaneous.....	327,000	029,000	26,400	402,400
Total.....	\$1,104,700	\$2,506,000	\$402,000	\$4,012,700

The last item includes purchases from smelters, sampling works and ore buyers. It is impossible to tell where it comes from.

The Ouray Times give a summary of the output of Ouray county by districts: Red Mountain, \$1,843,000; Mt. Sneffels, \$280,000; Poughkeepsie, \$305,000; Paquin, \$75,000; Total, \$2,503,000.

In San Juan county there has been a marked increase of product, though dull times are complained of, and capital, which was expected, has not come. The tribute or lease system of mining has benefited them, however, as the La Plata Miner says: "We venture to say that the leasing of mines in this county during the past year has done more to develop our resources and swell our ore product than all of the Eastern capital that could find room in our mountains. The lessee is deserving of more than passing attention, for it is to his indomitable pluck and confidence in certain properties that has brought them from unproductive prospects to regular producing mines."

The same paper says: In making up the table for the output we have thought best to omit the names of the mines, for the reason that many of the mine owners are averse to giving it for publication, and the ore buyers and samplers do not like to give names and amounts. So by giving totals handled by each firm all or nearly all is included, and the private business of none interfered with. Nearly one-half of the county product was bought and treated by the N. Y. & San Juan smelter of Durango. These works, although located outside of the county, are almost looked upon by San Juaners as a county institution, the business relations be-

tween it and our miners being so close, and is, perhaps, somewhat exaggerated on account of the friendly relations which have grown up between them on account of the fair dealings of this concern. The general manager, Mr. J. A. Porter, expects to be able to handle double the amount next season which he has handled this.

STOKER SAMPLING WORKS.	
Sampled.....	Tons.
Shipped without sampling.....	5,773.72
Shipped with sampling.....	74.75
Total handled.....	5,848.47
Value.....	\$154,786 35
DUYCKINCK & SCHUYLER.	
Total amt't of ore handled.....	2,875
Total value.....	172,500 50
SWERT & COOKIN.	
Total handled.....	750
Value (est.).....	45,000 00
NEW YORK & SAN JUAN SMELTER.	
Amt't bought that did not pass through the samplers.....	2,133.33
Value.....	166,072 05
For five months ending May 31st.....	25,019 00
For balance of year (est.).....	21,000 00
Output (est.).....	\$25,000 00
FROM OTHER SOURCES.	
Shipped to Denver and other points.....	800
Value.....	80,000 00
Grand total.....	\$1,289,478 61
From outside of county.....	82,040 45
Leaving product of county.....	\$1,207,438 19

Southwestern Colorado has made rapid advances towards a just recognition among mining men and investors, during the past two years. The hullion from a few furnaces and stamp-mills, together with thousands of tons of valuable cruds ore shipped out, has dispelled all doubts regarding the real merit of the great lode veins of the San Juan country. Capitalists will still find abundant opportunities for favorable investments there, in that class of properties, and also in that most fascinating of all ventures—placer mining. If the newspapers of that part of the State are talking truthfully, there must be immense tracts of very rich gravel deposits awaiting the assistance of capital and experience to yield enormously.

It would be, of course, impossible in the space we have to spare to give a very extended review of so large a mining region as Colorado. Capital has taken hold of mines there in every direction and there is more probability of the annual output being increased than of its lessening for some time to come.

IDAHO.

Idaho Territory mines are now making a good record. The newer camps, have by their production in the past few years, attracted many miners to the Territory, and the result has been a good deal of prospecting, and many discoveries. The Wood River region, opened five or six years since, is one of the prominent camps of Idaho, and is quite an extensive one. It was rather dull the first part of last year, but recently many new discoveries and strikes have been made. Everywhere along the gulches trending toward the river valley, prospects here almost unheard of, or abandoned, have developed into large producing and paying mines; the prospector has renewed his location infused with strong faith in the final outcome of his efforts; new mills and smelters have been put in place, or bargained for by prospering mine-owners and a promise of financial success seems to pervade mining generally throughout the entire galena belt lying within the Wood River region.

The Wood River Times says that it "has been pretty fairly demonstrated, through this section of country, that deep mining pays. The ore bodies do not always increase in richness as depth is attained, but they almost invariably widen out and possess a uniformity of value per ton, which makes a mathematical calculation as to their paying qualities so nearly certain that the capitalists cannot fail to see that investment here, in ore in place, is almost as sure as any of the commodities of commerce which are already in market. We cannot but feel that a new era is dawning for Wood River, not that we anticipate a boom and a rush, but rather that the legitimate growth, in all our varied interests, will increase in a more rapid ratio than ever before."

From Ketchum, one of the towns of the region, the Philadelphia smelters shipped, in 11 months of last year, 1780 tons of bullion; Clayton and Bayhorse, 573 tons; Ketchum ore, 352 tons; Clayton ore, 121 tons.

In the past year the number of producing properties is said to have doubled, and there is a large number of mines not up so far to a producing basis. The greatest producing mine of Wood River is the Queen of the Hills. It is completely outfitted, and has the best ore concentrator in the country. The pay ore is said to average six feet in width. The ore product is one-fifth first-class, and is run through breakers and shipped. The other four-fifths is good concentrating ore, and on being run through the mill is reduced about six tons into one of concentrates. The concentrator, as now constructed, has four pair of rolls, ten three-compartment jigs, a Westinghouse engine, and a Pulsometer pump, lifting water for mill use out of a well. Its capacity is 100 tons a day. The

Salt Lake Tribune gives some interesting facts about this and other mines about Wood River. From October 1, 1884, to December 1, 1885, a period of 14 months, we have the following grand results of the operation of this mine and mill: total ores and concentrates shipped sold, 7,273,009 pounds, aggregating 3636½ tons. The gross value of these ores aggregated \$464,078.98. Out of this amount the company paid transportation and freight charges, aggregating \$134,540.63. This left them net receipts of \$329,538.35. The cost of \$37 per ton in freight and smelting charges took almost one-third the value of the ore. We have spoken of the large net receipts after paying such heavy freight and smelting charges. Out of those receipts came the funds to place \$70,000 in machinery; to develop the mine by cuttings aggregating over one mile in length, for which miners and other workmen were paid; powder, fuse and other supplies purchased, besides paying about \$20,000 in the purchase of adjoining claims and lots, and meeting seven dividends of \$12,500 each, aggregating in dividends \$87,500.

Mine timber costs five cents per running foot; coal, \$10 by the carload; men, \$3.50 a day, 10-hour shifts. This cost of concentrating is about one dollar a ton, and they get nearly all the value in this material.

First-class ore runs from \$5 to 98 ounces silver, and 70 to 75 per cent lead in shipping lots. Concentrates go 70 to 87 ounces silver, and 60 to 75 per cent lead. Fifty men are employed in the mine and twenty-five in the mill.

The Minnie Moore is another great property formerly a large producer. In 1885, it produced \$90,000; the Humburg produced \$40,000; this Idahoan has paid \$80,000 in dividends in 1885.

The operations of the Philadelphia Smelting Co. at Ketchum have been successful. Two thirty-ton stacks were kept running since last June, the output of bullion aggregating 2500 tons, assaying 200 ounces silver and a few dollars in gold, bringing the value of bullion up to \$750,000. These works give direct employment to 75 men besides 15 coal burners under contract, and a large number of teams and men hauling supplies and ore. Besides this work of the smelters, this company operate four mines, two of which are under lease. In the two mines and the concentrator connected with them, employment is given to 45 men. Their concentrator has a capacity of 40 tons daily, reducing six tons to one, and is located near the North Star mine on the east fork of Wood river.

At Galena, there is a small smelter, but there is not very much going on there. Little Wood River is another district, not very much developed as yet, but in which there are many locations. The Little Smokys is another mining region now coming to the front. The Sawtooth county, it is hoped, will do better in 1886 than last year.

During last season shipments of ore were made to the Ketchum smelter from the Chloride, Summit No. 1 and No. 2, Cambria, Mammoth, Pilgrim, Silver King, Real Estate, Ruth, Sunbeam and Atlanta mines. The Last Chance sent ore to the Galena smelter. During the winter the following mines are being worked: Silver King, by Henry Tevis and associates, of Philadelphia; Bidwell & Beaver and Columbia, by the Sawtooth Milling and Mining Company.

At Vienna, the Vienna Company have a 20-stamp dry crushing mill, but it does not run continuously, because they do not get ore enough.

In the great Yankee Fork county, is the 20-stamp mill and complete plant of the General Custer mine, which has produced in all \$3,500,000. The mill is now working 30 tons of \$40 rock per day. The famous Charles Dickens mine is not now productive, being in litigation.

At Bayhorse the smelters have been closed of late, but work is going on in the mines. At Lost River are large veins of copper ore. Lava district has a few rich mines, and many prospects. In the famous old Boise basin the mining interests are by no means extinct. For several years they have been changing from placer to quartz mining, and while fewer men are employed the output of gold and silver for several years past has been quite uniform, and probably for the past year may be put down at low figures—at \$2,000,000, something less than half of which is gold. Some, in a position to warrant a judgment, place the production higher. The quartz interests of the region are coming to the front.

The old Silver City mines are being worked in a few instances, and better times are hoped for, and it is predicted that the coming season the bullion shipment will be more frequent.

The Cœur d'Alene mining district which many were ready to abandon last year, and which some in fact did abandon, is turning out to be all that was hoped for even during the period of high expectation which led to the celebrated stampede. It has been demonstrated by the test of actual gold production that the district is a rich one. The camp or district has now a population of about 2500 and the Oregonian says the output of gold dust for the past year has been about \$400,000, or above \$1000 per day. A circle fifty miles in diameter drawn around the town of Murray as a central point, would take in all the mines which go under the general name of "The Cœur d'Alenes," and all the country included in the Cœur d'Alene district. Discoveries of both gold and silver have been made all over the district, but the main gold finds are along the Cœur d'Alene river and its tributaries, or about the middle of the imagined circle. The main silver discoveries are in the south and southeastern parts of

the district. The trend of the gold ledges is northwest and southeast, and the trend of the silver ledges is northeast and southwest. The placers of course are along the streams.

The greater number of the 2500 men now in the camp are independent miners who work the shallower places in pairs or squads as partners. Each "firm" of two or more owns its mine and operates it by the small and laborious methods which alone poor men can employ. The diggings are not of a sort favorable for this kind of mining and it is only because they are very rich that profit is found in working them in this way. The shallowest ground in the district would be called deep anywhere else. In very few places is bed-rock reached short of 12 feet and in many places it lies even deeper under a coating of worthless soil and gravel. But the mineral is there and in spite of its deep hiding and the difficulties of reaching it, it is being brought out in very considerable quantities.

Capital, as usual after long delay, has found its way into the district and is preparing to revolutionize methods and to take out thousands where now only tens of dollars are mined. Many small ditches have been built and an immense flume to cost above a quarter of a million dollars is in course of construction. There is a 10-stamp mill in operation at the Golden Chest quartz ledge. Twenty-five tons of ore is reduced daily. How much it yields is not made public; but it is quite well known that the mill is making "a big thing" for its owners.

The Galena fields are not less extensive than the gold fields. They lie to the south and southeast, and have been prospected thoroughly. In one instance a drift has been run into the mountain side a distance of 350 feet. Practical men and experts are convinced that the ledges are rich and permanent, and recently several of the mines have been sold to capitalists who will put in smelters in the early spring. Also two more mills for the gold ledges have been contracted for.

MONTANA.

Montana has of late made as rapid advances as any of the hulsion-producing regions, mainly owing to the magnificent ore production of the camp of Butte, now the liveliest mining camp in the United States. After the working out of the marvelously rich placer deposits in Montana, many years ago, the mining industry of the Territory languished for a long time. Then came the new discoveries at Butte and elsewhere, and the building of railroads. Since then Montana mining interests have been more important than ever. Some of the finest reduction works in America have been put up, and the output of hulsion is such as to have brought Montana to the third place in point of production, taking the next rank below California, and leading Nevada.

Of course each year very wild estimates are made of production, some of them exceeding by two or three times the actual returns. Yet Montana should be proud of her record as it stands. Moreover, it is probable that her hulsion yield will be increased for some years, as her mines are well opened. There are abundant facilities for reduction of ores and for transportation. There are plenty of mines and miners, and capital has been brought in where needed. The letters of our special correspondent, Mr. Huston, who has been traveling through the Territory of late, have given many details of the mining situation in the Territory, so it is not necessary to go into any very extended review at this time. Not only are mining affairs there in good condition now, but they are also improving in every direction. The only drawback of late has been the very low price of copper, which has, of course, been disadvantageous to the extensive copper mines, which are second only to the famous ones of Lake Superior.

The most important camp is Butte. It is estimated that the average ore output of the district reaches 60,000 tons per month, one-fourth of which is produced by the Anaconda mine and shipped to the great works at Anaconda. A portion of the rest is reduced in the mills and smelters here and the balance shipped to points east and to Europe. The Butte *Inter-Mountain* annual gives the names of the stamp mills, with the number of stamps.

	Stamps.
Alied	80
Lexington	60
Moulton	40
Silver Bow	30
Centennial, rollers, capacity	20
Dexter	15
Old Lexington	10
Clippert	10
Total	265

Although these mills are run at their full capacity and treat over 300 tons of ore each day they are inadequate to meet the demands of the ore producers, and many mines are unworked by reason of a lack of proper facilities for reducing their output.

Smelters.

The following list includes the smelting and matting furnaces:

Smelters	Capacity in tons.
Colorado	300
Montana	300
Clark's Columbia	100
Bell	100
Parrot	200
Liquidator Concentrator	100
Butte Smelting Co.	250

The cost of concentrating copper ores at the works here is about \$1 per ton; cost of roasting, \$3 to \$3.50 per ton; cost of matting, about \$7 per ton.

Free milling silver ores are worked at custom mills for from \$10 to \$15 per ton. The great cost of salt laid down at the mills is a serious obstacle to the development of mining properties. The several mills use \$33 tons per month or about 10,000 tons per year. The railroad freight charges—\$20 per ton for a 400 mile haul—amounts to \$200,000. The first cost of the article, together with its transportation to the mills, amounts to \$6 per ton or \$60,000 per year, making an aggregate of \$260,000 per year paid by millmen for the single item of salt. Steps are being taken by the millmen of the district looking to a reduction of freight charges on the article.

Butte's output of precious metals for the year 1884 was a trifle over \$8,900,000.

For 1885 the *Inter-Mountain* makes an estimate of the output of the camp, which is about a million in excess of the figures given by Wells, Fargo & Co. for the whole territory. The *Inter-Mountain* says: "For the year 1885 the product of the camp reached \$15,350,800, an increase of \$6,408,800. The estimate is based upon actual shipments of copper ores, matte and tailings, silver ores and bullion from Butte. The table of shipments shows the following:

	Tons	Value
Copper ore	215,111	\$6,608,800
Matte and tailings	12,455	2,000,000
To which must be added 365,000 lbs. silver bullion shipped by Pacific Express Co.	523	750,000
Grand Total		\$15,350,800

"The Anaconda mine contributed \$3,560,000 to this output. The credit is given in the 218,111 tons of copper ore shipments, the larger portion of which was sent to the smelting works at Anaconda for reduction. The present outlook of the mines warrants the assertion that the output of silver and copper for Butte for the year 1886 will reach \$25,000,000."

The tables compiled by the freight agent of the Union Pacific Railway from January to December, 1885, gives the shipments of copper ore for 1885 as 218,111, an average of 158,131 tons over previous year; matte and tailings, 12,455, an increase of 485 tons; silver ore, 523 tons. The camp imported 9972 tons of salt last year.

The famous Anaconda copper mine was bought not long ago by J. B. Haggin, of San Francisco, for \$30,000, and about \$600,000 have been spent upon it and its machinery, etc. The total output of the mine for 1885 was about 180,000 tons, valued at \$3,560,000.

Those interested in mining in Beaverhead county have every cause to feel proud of the brilliant results which have attended their labors during the year of 1885. Seehree, Ferris & White have handled about all of the bullion and ore shipped from the county, and they report to the Butte *Miner* the following as the result of the past year:

	Pounds.	Value.
Base bullion	200,000	\$ 51,000
Ore	1,355,000	145,000
Gold dust and bullion		105,000
Total		\$201,000

This is about double that of the previous year, and is only a small item compared with what seems to be in store for them in the near future. The most important developments during the year have been made in the Bald Mountain districts, in the Polaris and Lost Cloud veins.

Of Meagher county the estimated total output of precious metals and iron, copper, lead and coal for 1885 is \$248,000.

The *Miner* also estimates the output of Jefferson county at \$15,000,000 for 1885.

The estimated amount of metal received at the U. S. Assay Office at Helena for 1885 is as follows:

	Gold.	Silver.
First quarter	\$100,900.70	\$26,549.65
Second quarter	280,679.50	20,099.02
Third quarter	401,056.91	4,230.65
Fourth quarter	327,990.71	4,268.72
Grand total for both metals	\$1,110,627.82	

The Granite Mountain mine, Phillipsburg district, Deer Lodge county, is a very rich one. From Dec. 2, 1884, to Dec. 1, 1885, the mill was in operation 326 days and treated 6963 tons of ore, from which 1,001,588 ounces fine silver were recovered, and the proceeds of sales of which aggregated \$1,037,500. Total output to Dec. 2, 1885, \$1,311,500. Since Dec. 23, 1884, regular weekly shipments of fine silver bars have been made. The company commenced paying dividends on April 8, 1885, and on Dec. 24, 1885, the stockholders received Dividend No. 13, aggregating \$580,000.

The output of gold dust from the placer mines of Deer Lodge county, for the year 1885, was about \$150,000.

At Virginia City, mining affairs are looking up. The famous Alder Gulch, which is estimated to have yielded from \$50,000,000 to \$75,000,000 in the aggregate, still yields from \$250,000 to \$300,000 per annum. The quartz mines of the various camps in the county are all very vigorously worked, and the results are reported to have been uniformly satisfactory. Those who are interested in the details of the various mines, can gain further information from the fine New Year's edition of the Butte *Miner*, which contains elaborate reviews of the various camps of the Territory.

A BILL has been introduced in Congress to make Montana a State.

NEVADA.

The mining industry in Nevada cannot be said to be generally in a very prosperous condition owing, mainly, to the decline in hulsion production of the junior Comstock lode. Yet on that lode the companies are working away as hard as ever in constant hope of again getting into bonanza. Last year at one time the lower levels were abandoned to the water, but now efforts are again being turned to deeper mining by the combined forces of several companies. The mines in the lode are all well equipped with machinery and its milling facilities are the best in the world. Some of the older and smaller companies, of which we used to hear in bonanza days, are doing nothing, but the larger properties along the lode are being systematically worked. Considerable hulsion is still being produced from ore mined in this lode, and the amount is such that in other camps it would be thought very great; but no dividends can be paid as the product is all used up in mining expenses. Immense amounts are paid out for labor and supplies annually. There is no thought of abandonment of the lode; on the contrary, renewed efforts are being made to pursue development in every direction. Those on the spot, who should know best, are very hopeful of striking good ore by following up indications.

Eureka district has many good and rich mines, two of which, particularly, the Eureka Consolidated and Richmond Consolidated, turn out immense quantities of base hulsion. The low price of lead has interfered with their business badly during the past year.

Some of the other camps have had a revival of late. This is notably the case at Aurora. Since the sale of mining property to capitalists recently, the prospects have materially brightened in that region. In fact, some years since, when Bodie was flourishing, material was taken from Aurora there; now the position is being reversed. There are several camps along the line of the Carson and Colorado railroad, which are in good condition. At Hawthorne the Lapanta and other mines are making a good showing. There is considerable prospecting going on in that region in the mining districts. A new mill has also been put up at Columbus district by the Candelaria Water Works and Mill Co., which will help matters in that camp.

In El Dorado canyon, Pennsylvania and Patterson districts, active mining operations are being pushed ahead. More active mining operations are expected to be carried on in Lincoln county this year than for some time past. We have given each week regularly the current news from Nevada's districts, so there is no necessity of our going over the ground at this time. The unsettled silver question has had much to do with the lack of interest in Nevada's mines of late. Men who have been investing on the Comstock seem to hesitate to go into the outside districts, in many of which capital is sadly needed, and where it would be well paid to invest. Men with really good mines seem to find it hard work to dispose of them or get the necessary reduction works. The districts in Southwestern Nevada are, however, now looking so well that more capital will doubtless be attracted in that direction in the future.

The State produces considerable borax, but even the borax industry has not been up to its usual standard for the past year.

Last year only 1500 tons of salt were shipped from the Eagle works on the line of the Central Pacific Railroad, in Churchill county. This is less than the amount formerly required to supply the demand of the Comstock alone, for milling purposes. In 1875 the salt produced commanded \$30 per ton. Since then the price has steadily declined, and it is now sold at \$17. The salt water flows from an artesian well, and is precipitated into vats excavated on the surface. This well is only 12 feet in depth.

We have elsewhere referred to Nevada's position in the list of hulsion producers.

NEW MEXICO.

The mining industry in New Mexico is not in as prosperous a condition as has been hoped and expected. The country badly needs the assistance of capital to develop what mines have been discovered; and it needs, also, mills and smelters to reduce the ore that is being produced. Where a lot of miners open their prospects and take out ore and can not sell it, or have it reduced, they, of course, become discouraged. There is little use in men trying to open mines under such circumstances, or to try and develop the country as it should be. The miners of New Mexico have had a great deal to contend with in this respect, and it is a wonder they have done as well as they have under the circumstances. The prevalence of Mexican land grants in the country has also done much to retard progress, as there is no use in miners finding mines where they can get no title to them.

The principal mining counties in the Territory are Colfax, Donna Ana, Grant, Lincoln, Santa Fe, Sierra and Socorro. In Grant county are the old mining camps of Georgetown, Silver City, Steeple Rock and others. The celebrated Lake Valley district in Sierra county is

the most important camp in the district, and many mines are being worked there.

All over the Territory, however, are many "prospects" and undeveloped claims. The Socorro *Bullion* has this to say concerning the mining industry: Out of the 30,000 mineral locations effected in Socorro county, in almost every instance the cause of the discovery is due to plain croppings above the surface, and there still remain, without the shadow of a doubt, large ore bodies, where the indicator caps or croppings of quartz, iron or spar have been swept away by the elements or obliterated by disintegration and then being covered by accumulated debris, and thus hidden away from the prying eyes of man.

Mining in the principal districts is now being performed on that class of claims which, as in the case of the Kelly, Graphic, Merritt and others, display their ore plainly to view. The time is, however, rapidly coming when prospecting companies will run their tunnels and sink their shafts on favorable looking sites with a view of intersecting pay ore bodies supposed to exist below the surface, as is done in Joplin, Leadville, and many older mining camps. This species of operation is hazardous, but it has resulted in the discovery of rich ore bodies. Our camps will be no exception to this rule. At this very moment a company has been organized which will make Socorro and Sierra counties the field of their operations. They have secured two tunnel sites in this county, and are prepared to make a considerable outlay of capital. From the meager information in our possession we anticipate a successful issue to their enterprise.

One fact remains uncontradicted: that there is still room for prospectors in Socorro county, and the coming year will be characterized by the number of prospecting companies who will send their agents to New Mexico to seek in several now neglected camps new sources of treasure.

OREGON.

More attention is being turned to mining in Oregon of late than for many years past. Southern Oregon particularly has done well. Several mills have been erected, and a great deal of prospecting is being done. During the year 1885 the product of placer gold in Baker county aggregated about \$900,000, and hulsion from quartz leads, gold and silver, about \$400,000. The present and prospective activity in mining gives promise of making the output of precious metals for 1886 several times greater than that of the year just closed. In Josephine county, where the principal industry is mining, during the past three years but little has been done—the seasons not being favorable. This year, however, a different state of affairs exist, as the rains came early and abundant, and many mines which have been idle for some time are now producing handsomely. It is estimated that more gold has already been taken out this season than during the whole of last. This being the case, the miners look forward to renewed prosperity, as a large per cent of the population depend upon the mines for their support. Many are prospecting, and some good quartz discoveries are occasionally made, which will be the ultimate means of introducing capital into the county.

All the miners in the Big Apple section are busy. There are 50 miners at work on Rogte river and its tributaries between the Big Bend and Mule creek, in Curry county. The indications are favorable for a prosperous season. In Steamboat district there is plenty of water this season, and the prospects are good. In Willow Springs and Blackwell districts a good deal of prospecting is going on. All over Southern Oregon there are hundreds of prospectors at work.

The excitement of the past year in Oregon was the Pine Creek mines. There was not enough done to really tell the value of the mines, but many think there will be a number of other good mines found in the district next spring. The great want of the region is reduction works. Numbers of miners have taken out small lots of ore, but they have no way of reducing or disposing of it.

The men who left the camp during the winter, after spending several months there, intend returning in the spring to resume work, an indication that they who ought to know best believe in the future of the camp.

There was some little talk during last summer of great success with the gold beach sands which could not be worked with much profit until a certain machine was invented. It seems now, however, according to the Coos Bay *News*, that the Pugh Black Sand Machine has proved an utter failure. At the Black Hawk mine the machine used up 100 pounds of quick-silver, with a result of \$2.50 in gold.

In addition to her gold and silver, Oregon produced last year 1965 tons of pig iron worth \$36,475, which shows a slight increase over last year's product and value.

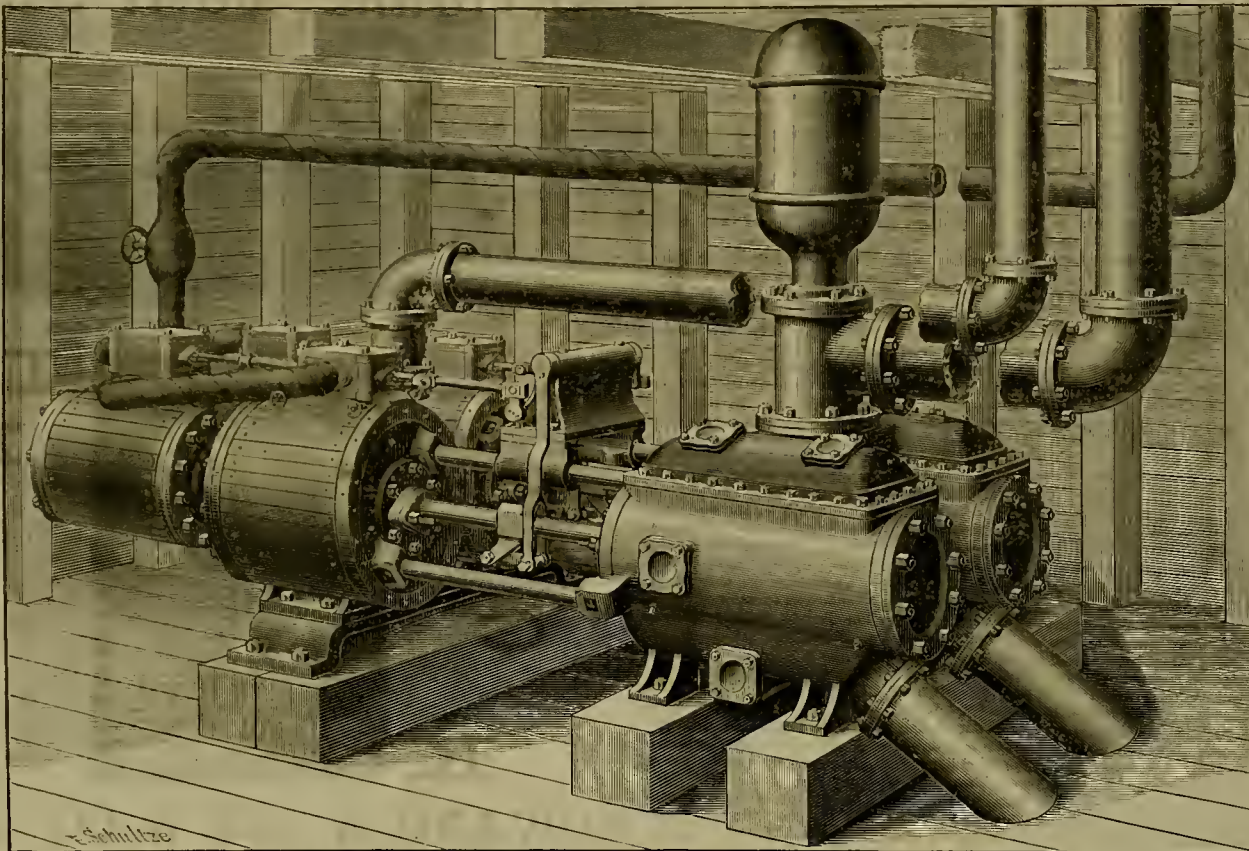
UTAH.

Utah Territory has some of the best dividend paying mines of precious metal in the United States. Of late, too, her metallurgical industries have been advanced by receipts of ore from Montana and Idaho. Several of the Utah camps are doing exceedingly well, and shipping large quantities of hulsion. In another column we give a table showing the product for

(Continued on Page 66.)

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Jersey, and recently at Buffalo, New York, show the consumption of coal, compared to that consumed (doing the same work) by rotative engines at Montreal, Canada, to be less than .31 per cent; Shepard engines, Buffalo, less than .42 per cent; Cornish engines, Louisville, Ky., less than .45 per cent; Cornish engines at Cleveland, Ohio, less than .55 per cent; the best Cornish engine in America, at Jersey City, N. J., less than .57 per cent; Fall River, Mass., Rotative engines, less than .33 per cent; and have all been superseded by the Worthington. The above-mentioned tests of Worthington Pumping Engines show a consumption of less than .45 per cent for the same duty that the Chicago Water Works engines show for nine years.

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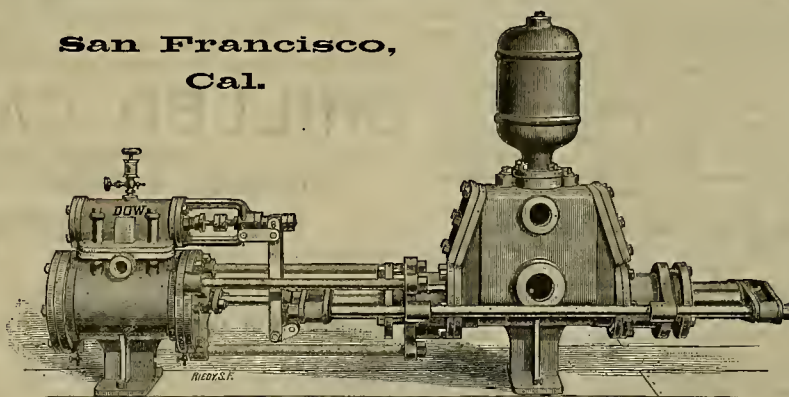
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Mining Review.

(Continued from Page 66.)

flat pieces. It is not yet found in paying quantity, however sanguine expectations are entertained by all interested parties that it will pay them.

ALASKA.

Very little note has usually been taken of Alaska, as far as mining is concerned, but it is now coming into prominence as a gold producer. It has now, on Douglas Island, one of the largest and most completely outfitted gold mills in the world reducing a low grade ore which is paying well. They are sending down about \$75,000 a month in gold from this mine alone. The mill has 120 stamps, with concentrators, etc. The mine appears to be a great mountain of quartz. In the rear of Juneau, two or three miles, on the mainland, is Silver Bow basin, where some rich placer mines are being worked. In the near vicinity of Sitka there are promising ledges. On Prince William, Cook's Inlet, in the Chilkat river and the Yukon, and in many other places, it is to be discovered.

From Ore Sales 2,375,820.84
Dore Bars 1,330 to have been discovered
Total 2,375,820.84

The mill has worked the past year to 94.95 per cent, 2½ per cent better than ever before, partly due to the large admixture of free ore from No. 3. The ore was graded 20 ounces lower than in 1883, but more ore was run through and more of the value was saved. Yearly they have improved in methods and appliances for extracting and reducing ores.

The cost of mining has been largely reduced, and treating has been brought to perfection. We need not describe the process—that of chloridizing and amalgamating. One hundred men are carried on the mill pay-rolls at an average wage of \$3.50.

From the organization of the Ontario Silver Mining Company and the starting of their mill February 1, 1877, to December 31, 1885, 144,568 tons of dry ore have been reduced and sold, the product of which sold for \$15,856,369.05. Prior to that the Ontario Company had realized \$1,014,596.96, representing, assuming that the ore graded the same as all the ore since, 10,290 tons of dry ore. The total output of the mine to date is, therefore, 154,858 tons of dry ore, realizing to the company \$16,870,966.01—\$102.42 per ton. The mine paid its 102d dividend of 50 cents per share—64 on 100,000, 38 on 150,000 shares—in all, \$6,050,000, December 31, 1884; \$51 per share on the old shares; \$19 on the new shares.

The property is chiefly owned in San Francisco, but is managed by R. C. Chambers, of Salt Lake. The cost of mining was approximately for 1885, \$12.00; of milling, \$14.27; general expense, hauling, prospecting and dead work, and repairs, \$5.43 per ton.

This mine is at Park City. Some of the minor properties of the same camp are doing well, but we have not space to mention them all. The Crescent, one of the big mines there, has some seven miles of cuttings upon it in opening up the ore bodies. During the past year there were driven drifts to an aggregate length of 3500 feet, while stoping was done to the extent of 108,000 cubic feet. In stoping, square sets of timbers are placed in, and what little waste there is is placed among the timbers to add strength. During the year there was used in timbering the mine 78,000 feet of timbers, 23,000 pieces of lagging, and 37,000 feet of other lumber. The company has on hand 50,000 feet of lumber and 70,000 feet of timber. During 1885 they extracted about 13,000 tons of first-class ore and 18,000 tons of concentrating ore. On the dumps there is fully 60,000 tons of concentrating ores to be sent to the mill. The output of the mine can be made almost any amount desired, since it has been so well opened. The regular employment of miners averages about 80. The capacity of the concentrator is 60 tons of raw ore per day, and it is proposed to increase this to 150 tons by the addition of more machinery. The first-class ore averages 35 per cent lead and 18 to 23 ounces silver. For the year ending Sept. 30th, they sold 11,581 tons of ore, which netted the company \$199,413. The amount of receipts, above disbursements, for the the year was \$138,470.

The Daly Mining Company's group of 75 claims on the western extension of the Ontario employs 80 men. They mine about 200 tons of 90-ounce ore per month. From the official statement published by Wells, Fargo & Co., compiled from Dec. 18th, 1884, to Dec. 17th, 1885, we calculate the output of the Daly Mining Company for the full year as follows: Dry ore, 9,154,494 pounds; containing silver, 475,451 ounces; containing lead, 1,131,265 pounds; net value realized, \$406,132.41.

For the most of the past year the Sandstone district, Silver Reef, Utah, has been very quiet. About November, however, discoveries began to be made of ore bodies, where their existence had never been dreamed of, and a good deal of what had been supposed to be "country" was found to be pay ore. These discoveries were, a good many of them, in old claims, the most notable exception being on the White Reef, west of the town. A good deal of activity resulted in the mining operations, but nothing on a large scale was added, and there is no call for more miners. Leachers have been

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and Uphi, over
Miner road for the year 1885
9521 tons. The effect of the advance in the price of lead may be seen as regards these districts in the monthly increase of ore shipments.

The Tintic country shows an increased output of silver-lead ores. The Eureka Hill comprising two locations yielded 11,300 tons of silver ore, running low in lead. Among other mines are the Red Bird, Keystone, Snow Flake, etc. The iron mines near Silver City shipped 9720 tons of ore during past year. There are quite a number of claims in that immediate locality which are doing well and give fine promise. The Northern Spy, managed by Colonel Graham, shipped 1100 tons high grade ore. The Martha Washington owned by Rife & Taylor took out \$800 in a small strike. In all there was shipped over the Salt Lake & Western, during the year 1885, an aggregate of over 34,000 tons ore, the value of which has not yet been made public. Besides this output Riter, Miller & Co. worked in the Homansville mill, which they have leased, ore that produced 25,465.25 ounces silver, and 410.57 ounces gold. There are many other districts of Utah which, if capitalists would take up, would doubtless prove rich. Utah can now, however, show a fine record, for the comparatively few mines being worked.

WASHINGTON.

Washington Territory has never been much of a gold producing region, her mineral resources consisting mainly in her coal mines. Veins and outcroppings of coal in almost every portion of western Washington indicate its general distribution and inexhaustible supply. On the Columbia river, lignite or brown coal appears in thin seams, extending continuously northward, the quality improving as we go north. The experience of a quarter century demonstrates the value of Washington Territory coal for economical and commercial purposes. Mines have been probably worked, and its coals rank among the best Pacific coals. In the fall of 1852, coal was discovered on Bellingham bay. From the first mines, 150 tons were shipped to San Francisco. The mine of the Bellingham Bay company was discovered in 1853, and opened the succeeding year. The San Francisco company which operated this mine continued the only exporter of coal for the territory down to 1870. In 1871 the exportation of coal commenced at Seattle. As early as 1854, coal mining had been pursued on Black river by Dr. Bigelow, but to no great extent. Concerning the coal mines the *Oregonian* further says: The Seattle, Renton and Talbot mines are in the vicinity of Seattle. The coal of all these mines is of the lignite variety, well adapted to steam and domestic purposes. The Seattle mine was discovered in 1866 by R. H. Lewis, who sold for \$30,000. The first shipment of coal was made to San Francisco in 1870, on the bark Moneyick, consisting of 405 tons. In 1874 the product was 50,000 tons. From July 1, 1878, to July 1, 1879, 155,900 tons. The year ending Dec. 31, 1879, 137,207 tons of coal have been produced. In 1874 the Renton mine was opened, producing during 1875-6 25,000 tons of coal annually. The Talbot mine, opened in 1875, produced in 1879 18,000 tons of coal.

The mining of coal is at present confined to King and Pierce counties. From January 1, 1884, to November 1, 1885, the King county coal mines yielded 413,315 tons. From January 1, 1884, to July 1, 1885, the Pierce county mines yielded 267,884 tons. Since that date the Pierce county mines have reduced their export until December, 1885, in which their shipment will probably reach 25,000 tons.

A few miners have lately been prospecting for gold about 25 miles southeast of Toledo, in this Territory. Gold is found in small quantity from the surface down as far as prospected, which is as yet limited to a ditch in order to get fall enough to wash coarse gravels with success, also with a view of going down to bed-rock, which is supposed to be about 15 feet from the surface. There are three kinds of the precious metal—shot gold, thread gold and

(Concluded on page 63.)

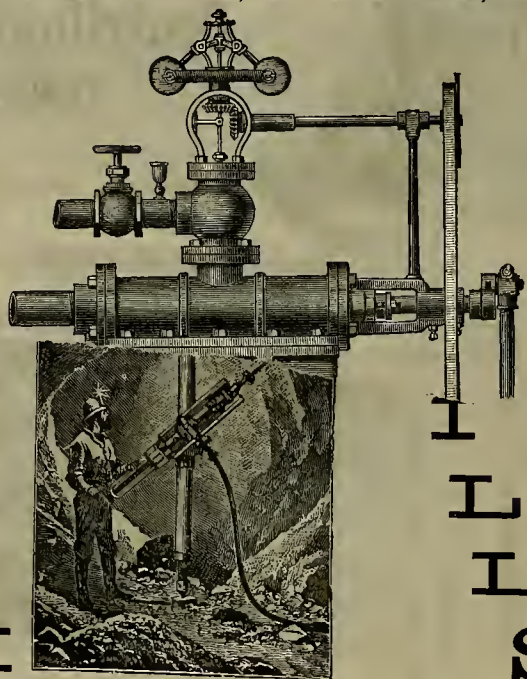
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The power per ton of ore crushed.
The wear is less than that of Stamps.
The wearing parts are easily duplicated.
It has a much better discharge and leaves the pulp in better condition for concentrating.
It is a better Amalgamator, saving fully nine-tenths of the gold in the mill (the balance can be saved on plates in the usual manner).
Its simplicity of construction obviates the need of mechanical skill.
It is continually crushing, not, like the Stamp, using power to suspend it in air ninety-nine one-hundredths of the time, and the balance, making a thundering noise and accomplishing comparatively small results. It is as far in advance of the Stamp mill as the present method of making flour with improved rolls is over the Indian's mode of crushing corn in a stone mortar.
I challenge comparison with the Universal Stamp Mill, as well as all other systems of rollers, balls or pulverizers, before the public.

I claim special merit in that feature of my system by which I prevent ALL FLOURING of gold and quicksilver, and the consequent loss of gold that attends stamp milling.

For the economical working of ores containing sulphurets, I particularly claim the adaptation of my mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed), that a complete concentration of sulphurets is rendered most easy.

The Huntington Mill has passed entirely through the experimental stage. Three years of continuous use at a large number of mines in California has enabled the inventor to perfect and improve the machinery until he feels justified in assuring the public that he has reached the absolute in the construction of a perfect Quartz Mill.

The following will explain the accompanying cut: The ore and water being fed into the mill at the hopper, H, the rotating rollers and scrapers throw the ore against the ring-die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they pass over it. The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of 1 inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet crushing and gold saving it has no equal.

The subjoined testimonials, from responsible mill men, show the high estimation in which the Huntington Mill is held by those who have practically tested it:

F. A. Huntington, Esq., San Francisco, Cal.—DEAR SIR: After five months' trial of your Centrifugal Roller Quartz Mills, can say I am well satisfied with them, and can cheerfully recommend them to any one desiring to crush ore, wet process. We have three of your 3½-foot mills, with three rollers each; crushing capacity of three mills, 22 tons in twenty-four hours. This, with our hard ore crushing through a No. 8 slot screen, is very good work. Formerly we had a ten-stamp battery with stamps of 900 pounds each; crushing capacity, 15 tons of our ore in twenty-four hours. The power required for running the three Centrifugal Mills is not any more than would be required for a five-stamp battery, 900 pounds each. The cost of keeping these mills in repair is not more than 60 per cent of what it would be to keep a ten-stamp battery in repair, a saving all around, with a great deal less noise

F. A. Huntington, Esq., San Francisco, Cal.—DEAR SIR: We have had one of your Centrifugal Roller Mills on the Eagle Gold Mine, and after which, by liberal offers from Stamp Mill Builders, we were induced to put up twenty stamps on the same mine, which we run in connection with your Centrifugal Roller Mills for several months, when we purchased the Spanish Mine at Washington, Nevada County, Cal., on which we decided to use your mills in preference to stamps. We are now running two of them on the Spanish Mine, crushing 60 tons per day, and we expect shortly to erect several more of your largest mills on the same mine. The mill meets every claim you make for it. Our order for the fourth mill after 18 months' trial evinces our faith in them and the great satisfaction their use has given us, and I am pleased to give them my unqualified endorsement, and can cheerfully recommend them for crushing (wet process) any grade of ore, either gold or silver.
Respectfully,
CHAS. B. SHATTUCK, Superintendent.

SAN SEBASTIAN GOLD MINING COMPANY'S OFFICE,
SANTA ROSA, SAN SALVADOR, CENTRAL AMERICA, August 4, 1885.
Frank A. Huntington, Esq., San Francisco.—DEAR SIR: I started your 3½-foot mills, and the two gave a good record of themselves. I had almost lost faith in getting a pulverizing mill that would answer in the place of stamps, but this is their record: I run 461 tons and 1700 pounds through the two mills at the rate of over 30 tons in 24 hours for the two mills. The small rings are not out of round, and do not pound, and will last for 150 tons more. I wish to congratulate you, and do so most heartily, for having the only wet pulverizing mill I ever saw that is a success.
Respectfully yours,
J. A. SPERRY.

F. A. Huntington, Esq., San Francisco, Cal.—DEAR SIR: In regard to your mill (Centrifugal Roller), I have crushed about 500 tons of rock in the mill, and am glad to say that it has given entire satisfaction, and can recommend it to the public as the most expeditious and least expensive method for crushing and milling ore that I have ever seen.
Truly yours,
THOS. HILDRETH.

Mr. F. A. Huntington.—DEAR SIR: We have had one of your Centrifugal Roller Quartz Mills in operation for the past three months, and can safely say that it is one of the best mills in use for crushing quartz and amalgamating gold. It is cheap and efficient, and will do all you claim for it. Yours respectfully,
JEWETT, SEAMANS & CO.

[Extract from letter.]

F. A. Huntington, Esq., San Francisco, Cal.—DEAR SIR: The ring and springs came to hand to-day. The mill runs like a daisy. We are opening up a fine body of ore, and have got the best little mill in the State. We have run three weeks, and the ring, die and rollers do not seem to show hardly any wear, and we have not worn out one set of screens yet.
Yours truly,
P. VEASEY, 222 Davis St., S. F.

Mr. F. A. Huntington.—DEAR SIR: After using one of your mills since the first of June, I am fully prepared to recommend it. It has a good crushing capacity; it is simple, durable, and easily managed, and will save more gold in the battery than any other mill, and is, beyond a doubt, the best mill now made.
I am, sir, yours respectfully,
R. B. STOCKTON.

Fine Gold District, Fresno Co., California.

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Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER COMPANY,

No. 218 California Street,

San Francisco, California.

Mining Review.

(Continued from Page 66.)

flat pieces. It is not yet found in paying quantity, however sanguine expectations are entertained by all interested parties that it will pay them.

ALASKA.

Very little note has usually been taken of Alaska, as far as mining is concerned, but it is now coming into prominence as a gold producer. It has now, on Douglass Island, one of the largest and most completely outfitted gold mills in the world reducing a low grade ore which is paying well. They are sending down about \$75,000 a month in gold from this mine alone. The mill has 120 stamps, with concentrators, etc. The mine appears to be a great mountain of quartz. In the rear of Juneau, two or three miles, on the mainland, is Silver Bow basin, where some rich placer mines are being worked. In the near vicinity of Sitka there are promising ledges. On Prince William's Sound, Cook's Inlet, in the Chitka river country, on the Yukon, and in many other localities, gold is reported to have been discovered. Coal, iron, copper and other minerals are reported as having been found at various points in the Territory. At Killisnoo, on Admiralty Island, there are bituminous coal seams, from which some coal has been mined, and from which one of the resident officials of the Northwest Trading Company obtains his regular supply of fuel; but the seams are badly broken up, and the coal unfit for use under steam boilers. The specimens of iron ore shown are very fine.

The Silver Bay mines have recently been purchased and will be opened when the season begins this year. The work will serve to test the value of the quartz veins of Sitka district. The prospectors from the camps are working in such directions as it is possible to go and probably more discoveries will be made. The difficulties of travel and transportation in Alaska, however, are very great, and it is no country for a poor man to go to as yet.

Testing and Working Silver Ores

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting, ore, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protodichloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, waste of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Knecht's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

Price, post free, \$2.00. Address Dewey & Co., MINING AND SCIENTIFIC PRESS, 252 Market St.

A YANKEE SCHOOL TEACHER IN VIRGINIA.—A tale of the Old Dominion in the Transition State. By Lydia Wood Baldwin. 12mo, 238 pp., paper. Price 25 cents.

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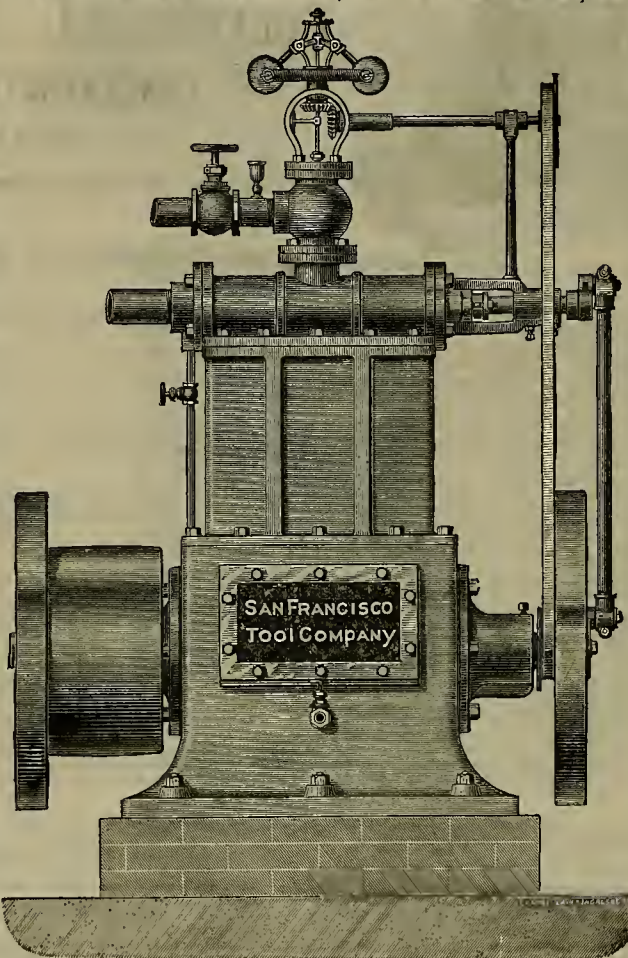
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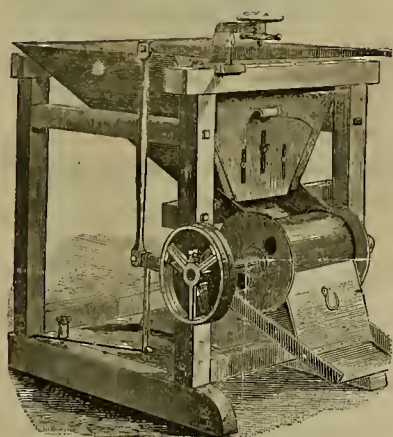
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NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 22d day of December, 1885, an Assessment (No. 1) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 4 (second floor), 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 27th day of January, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 15th day of February, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y.

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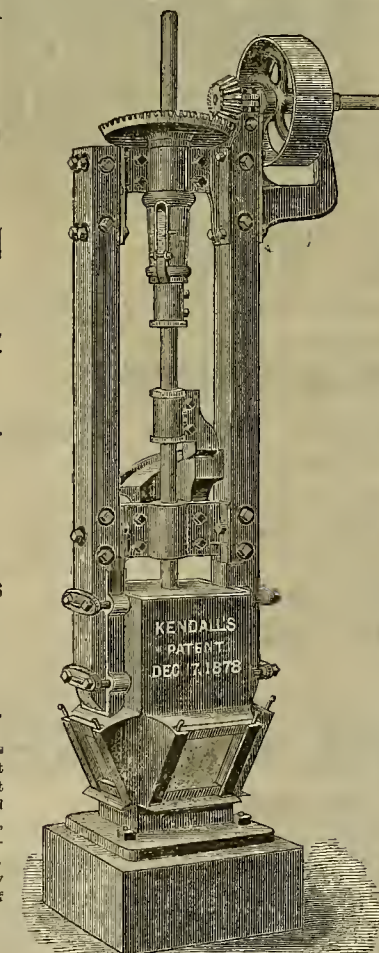
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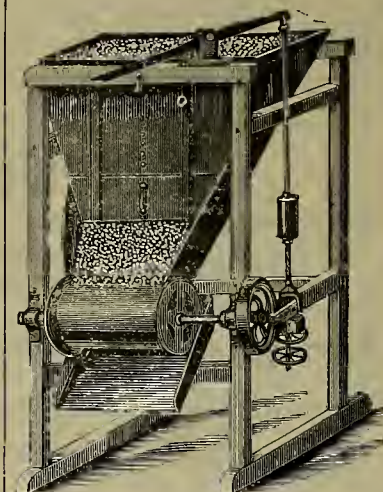
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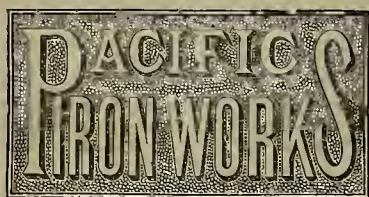
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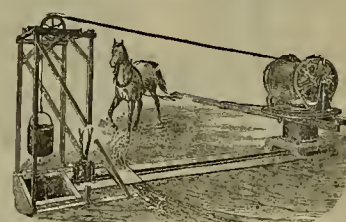
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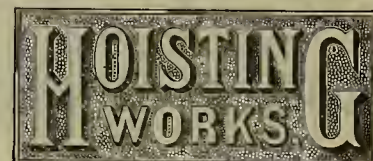
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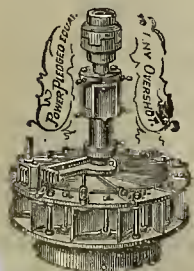
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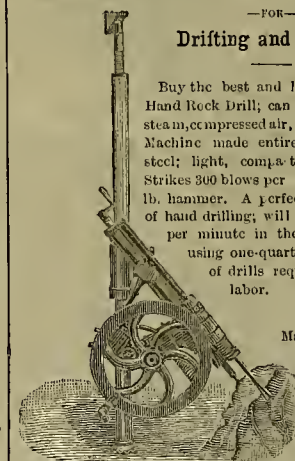
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Cibola Creek M Co.	Nevada.	J. W. Willis.	309 Montgomery St.	Annual.	Feb 3
Manhattan M Co.	Nevada.	J. Crockett.	327 Pine St.	Annual.	Feb 3
Standard Com M Co.	California.	J. W. Pow.	310 Pine St.	Annual.	Feb 1
Sierra Iron Co.	California.	H. P. Bush.	Merchants Ex.	Annual.	Jan 23
Win Penn M Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	Annual.	Feb 2

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Caladon M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Jan 22
Jackson M Co.	California.	D. C. Bates.	419 California St.	10.	Oct 5
Manhattan M Co.	Nevada.	John Crockett.	327 Pine St.	25.	Jan 20
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Jan 15
Syndicate M Co.	Nevada.	J. Stadler Jr.	419 California St.	10.	Dec 21

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication by NELSON GORON, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.			Red Bluff.			Sacramento.			S. Francisco.			Los Angeles.			San Diego.		
	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.
Jan. 14-20.																		
Thursday	.39	40 SW	Cy.	.14	44 SE	Cy.	.00	42 NW	Cl.	.03	50 NE	Cl.	.62	SW	Cl.	.69	W	Th.
Friday	.27	32 E	Cl.	.00	45 SW	Cy.	.00	48 S	Cy.	.00	51 SE	Cy.	.00	54 E	Cy.	.00	68 W	Cy.
Saturday	.00	26 NE	Cl.	.42	44 N	Cl.	.00	45 NW	Cy.	.03	61 N	Fr.	.02	54 SE	Cy.	.69	SW	Cl.
Sunday	.00	25 NE	Cl.	.00	45 SW	Cy.	.10	45 S	Cy.	.09	49 W	Th.	.26	58 W	Fr.	.58	SW	Cy.
Monday	.00	21 E	LS.	.03	37 N	Cy.	.02	45 SE	Cy.	.04	47 SE	LR.	.20	50 E	LR.	.66	SW	Cy.
Tuesday	.03	19 E	LS.	.00	41 E	LR.	.70	44 S	Fr.	1.27	55 W	Cy.	.00	58 W	Fr.	.66	SW	Cy.
Wednesday	.00	19 E	LS.	.00	41 E	LR.	.70	44 S	Fr.	1.27	55 W	Cy.	.00	58 W	Fr.	.66	SW	Cy.
Totals	.78			.03			.63			.56			.49			1.35		

EXPLANATION.—Cl, for clear; Cy, cloudy; Fr, fair; Fy, foggy; — indicates too small to measure. Temperature and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 31.	WEEK ENDING Jan. 7.	WEEK ENDING Jan. 11.	WEEK ENDING Jan. 21.
Alpa.	.40	.30	.30	.35
Andes.	.15	.20	.15	.25
Argenta.	.20	.20	.20	.20
Belcher.	.95	1.05	1.10	1.20
Bell.	.15	.15	.15	.15
Best & Belcher.	.35	1.15	.30	.45
Bullion.	.25	.30	.25	.30
Bonanza King.	.15	.15	.15	.15
Belle Isle.	.15	.15	.15	.15
Bodie Com.	1.75	2.20	1.90	2.00
Boston.	.15	.15	.15	.15
Bodie Tunnel.	.15	.15	.15	.15
Bulwer.	.50	.65	.60	.55
California.	1.25	1.55	1.40	1.60
Challenger.	.15	.15	.15	.15
Chollar.	.50	.75	.50	.60
Confidence.	.05	.05	.05	.05
Con. Imperial.	1.25	1.55	1.40	1.60
Con. Virginia.	1.25	1.55	1.40	1.60
Con. Pacific.	.20	.15	.20	.15
Crown Point.	.60	.80	.75	.80
Day.	.90	1.55	.70	1.30
Eureka Com.	1.10	1.65	1.50	1.65
Eureka Tunnel.	.10	.15	.10	.15
Exchequer.	.10	.15	.10	.15
Grand Prize.	.10	.15	.10	.15
Gould & Curry.	.50	.60	.50	.75
Goods.	.10	.15	.10	.15
Hale & Norcross.	3.35	7.75	2.60	2.50
Holmes.	.11	.11	.11	.10
Independence.	.05	.05	.05	.05
Julia.	.05	.05	.05	.05
Justice.	.05	.05	.05	.05
Martin.	.15	.15	.15	.15
Mono.	4.15	6.14	4.70	5.00
Mexican.	.30	.55	.35	.45
Mt. Diablo.	.30	.55	.35	.45
Northern Belle.	.30	.55	.35	.45
Navajo.	.30	.55	.35	.45
North Belle Isle.	.30	.55	.35	.45
Occidental.	.30	.55	.35	.45
Ophir.	.50	.75	.50	.60
Ovman.	.10	.15	.10	.15
Potosi.	.10	.15	.10	.15
Pinal Con.	.10	.15	.10	.15
Savage.	.95	1.55	.60	.80
Seg. Belcher.	.50	.75	.50	.60
Sierra Nevada.	.10	.15	.10	.15
Silver Hill.	.10	.15	.10	.15
Silver King.	.10	.15	.10	.15
Scorpion.	.10	.15	.10	.15
Syndicate.	.10	.15	.10	.15
Toga.	.10	.15	.10	.15
Union Con.	.30	.40	.30	.40
Utah.	.40	.55	.40	.50
Yellow Jacket.	.30	.40	.30	.40

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Jan. 21.	70 Holmes.	10.75
60 Belcher.	1.00	35c
50 B & Belcher.	1.00	35c
10 Bodie Con.	1.70	200
300 Challenge.	15c	50c
50 Chollar.	45c	100
200 Con. Pacific.	45c	100
765 Con. Va. & Cal.	2.00	35c
250 Eureka Con.	2.25	10
100 Gould & Curry.	80c	30
250 Hale & Norcross.	2.45	50
100 Mexican.	10.75	35c
100 Nevada.	10.75	35c
200 Overman.	3.50	100
50 Peerless.	25c	25c
100 Potosi.	35c	30c
100 Savage.	70c	70c
100 Sierra Nevada.	10.75	35c
10 Silver King.	8.25	10
30 Union Con.	25c	25c
300 Yellow Jacket.	95c	95c

THE Merced irrigating canal is rapidly approaching completion, and water is expected to supply the ditch in April. Everybody is looking for good times and lively business the coming season.

Dewey & Co., American and Foreign Patent Agents.

PATENTS obtained promptly; Caveats filed expeditiously; Patent Reissues taken out; Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examination ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Interferences Prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Soliciting promptly and thoroughly conducted.

Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced Inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

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In addition to American Patents, we secure with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and thoroughly established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of most inventions discovered here than any other agents.

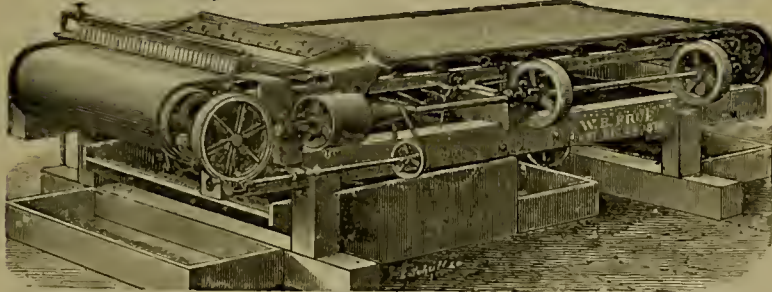
Situated so remote from the seat of Government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

Confidential.

We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communications and business transactions will be held strictly confidential by us. Circulars of information to inventors, free.

Home Counsel.

\$1,000 CHALLENGE!



THE FRUE ORE CONCENTRATOR, OR VANNING MACHINE.

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

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SAN FRANCISCO, CAL.

Market Reports.

Lumber at Wholesale.

The Redwood Lumber Association has established no prices since the first of the year.

Rawwood—Cargo prices are at present as follows: Rough, merchantable, \$1 M ft., \$19.00; Rough, clear and surfaced, \$21.00; 1x10 Rustic, No. 1, \$24.00; 1x10 Rustic, No. 2, \$19.00; 1x8 Rustic, No. 1, \$22.00; 1x8, tongued and grooved, \$21.00; 1x4, tongued and grooved, beaded, \$23.00; 1-in. x 3, Battens (board measure), \$30.00; Shingles, 4 M, \$1.05.

Pine—Rough, \$15.00; No. 2, \$12.00; do do in lengths, \$13.00; rough, 40 to 50 ft lengths, \$16.00; do 50 to 60 ft, \$17.00; T and G Flooring, 1x6, \$36.00; do do 11x0, \$28.00; do do 1x4, \$28.00; do do No. 2, \$21.00; Vertical Grain T and G Flooring, 1x6, \$30.00; do do 11x0, \$32.00; Stepping, \$37.50, Furring, 1x2, per lineal ft., 3 c.

Lumber at Retail.

Prices fixed by the association April 1st. are as follows:

Pine, Rough.....	\$15 00
" " No. 2.....	12 00
" " 2 to lengths.....	13 00
" " 40 to 50 feet lengths.....	16 00
" " 50 " 60 ".....	17 00
T. & G. Flooring 1 x 0.....	26 00
" " 11 x 0.....	28 00
" " 1 x 4.....	28 00
" " No. 2.....	21 00
Vertical Grain T. & G. Flooring, 1 x 6.....	36 00
" " 11 x 0, 1 x 4.....	32 00
Stepping.....	37 05
Furring, 1 x 2, per lineal foot.....	03
Redwood, Rough.....	17 00
" " No. 2.....	13 00
" " Surfaced.....	30 00
" " 1 x 8.....	28 00
" " 1 x 6.....	28 00
" " T & G 6 in. 12 ft. and over.....	28 00
" " 7 to 12 ft.....	25 00
" " under 7 ft.....	20 00
" " Rustic.....	30 00
" " No. 2.....	25 00
" " T. & G. Beaded 12 ft. and over.....	30 00
" " 7 to 11 ft.....	25 00
" " under 7 ft.....	20 00
" " Siding, 1 in.....	22 50
Pickets, Fancy.....	25 00
" " Rough Pointed.....	15 00
" " Square.....	14 00
Battens, 1 x 3 per lineal ft.....	03
Shingles.....	2 00
Laths, 1 in.....	3 25
" 1 1/2.....	3 75
Dunnage Boards less 5% delivered.....	16 00

Price subject to change without notice.

Coal.

PRICES "TO ARRIVE."

	Per Ton.		Per Ton.
Australian.....	\$8 00 @ 12 1/2	Cardiff.....	\$6 75 @ 7 00
Liverpool Steam.....	62 1/2 @ 75	Lehigh Lump.....	13 50 @ 14 00
West Hartley.....	7 00 @ 75	Cumberland bk 8 00 @ 8 25	
Scotch Splint.....	6 50 @ 75	Egg, hard.....	10 00 @ 10 00

SPOT PRICES.

	Per Ton.		Per Ton.
Australian.....	\$8 87 1/2	Cardiff.....	\$7 00
Liverpool Steam.....	5 75	Lehigh Lump.....	14 00
West Hartley.....	7 50	Cumberland, bulk.....	8 50
Scotch Splint.....	6 75	Egg, hard.....	10 50

PRICES "TO ARRIVE."

	Per Ton.		Per Ton.
Eglinton.....	\$21 50	Clay Lane White.....	\$22 00
Glenagarnock.....	22 50	American Soft No. 1.....	23 00
Shotts No. 1.....	24 00		

SPOT PRICES.

	Per Ton.		Per Ton.
Eglinton.....	\$22 50	American Soft No. 1.....	\$24 00
Glenagarnock.....	23 00	Clipper Gap, Nos. I.....	24 00
Shotts No. 1.....	24 50	to 4.....	22 00 @ 23 50
Clay Lane White.....	24 00		

Newspaper Agents Wanted.

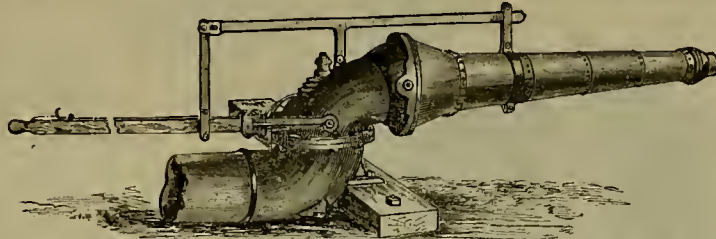
Extra inducements will be offered for a few active canvassers who will give their whole attention (for a while at least) to soliciting subscriptions and advertisements for this journal and other first-class popular newspapers. Apply soon, or address this office, giving address, age, experience and reference.—DEWEY & CO., Publishers, No. 252 Market St., S. F.

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As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their Scientific Press Patent Agency (S. F.) from week to week and year to year.

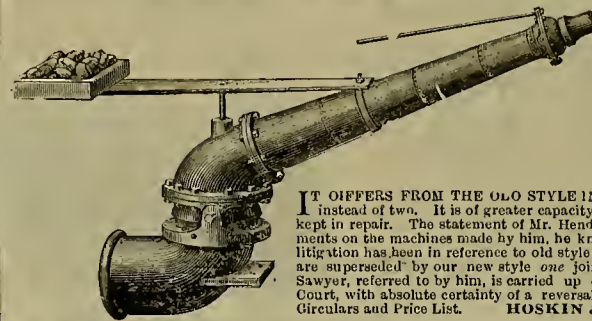
SOME of the valley land above Napa is being drained with tiles.

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The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

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Preface; Introduction; Implements; Assay Balance; Methods; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorchification; Cupellation; Weighing the Bead; Farding; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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ARIZONA's public schools are being closed for want of money.

Dewey & Co.'s Scientific Press Patent Agency.



OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

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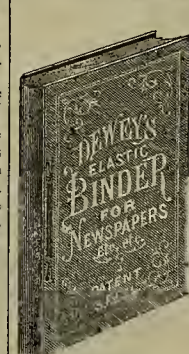
DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half-year ending December 31, 1885, the Board of Directors of the German Savings and Loan Society has declared a dividend at the rate of four and one-half (4 1/2) per cent per annum, on term deposits, and three and three-fourths (3 3/4) per cent per annum, on ordinary deposits, and payable on and after the 23 day of January, 1886. By order. GEO. LETTE, Secretary.

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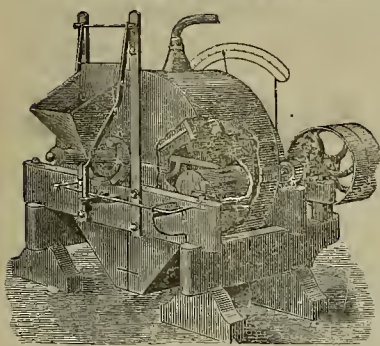
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Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

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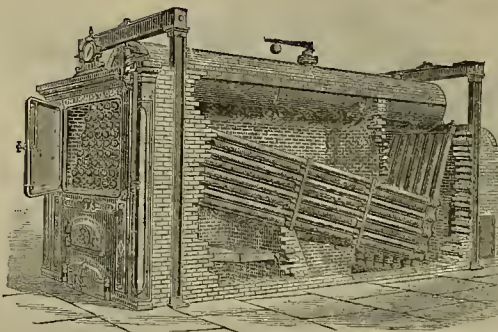
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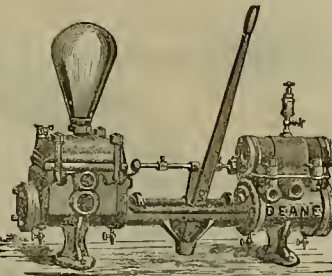
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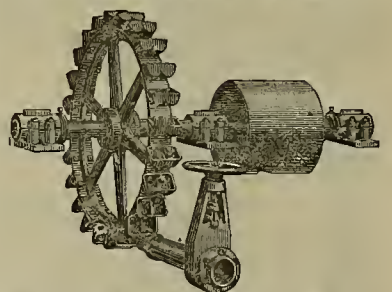
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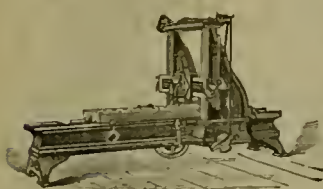
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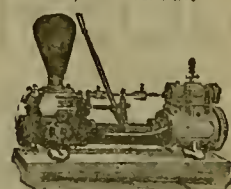


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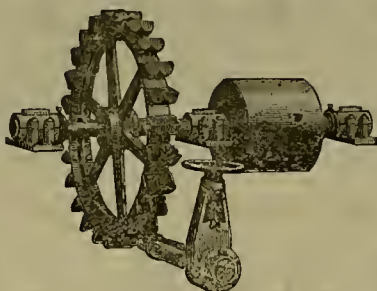
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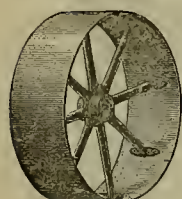
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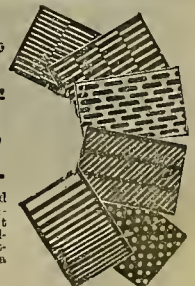
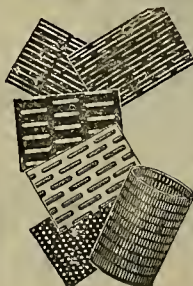
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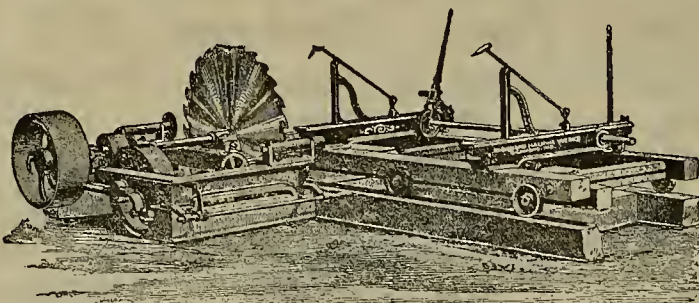
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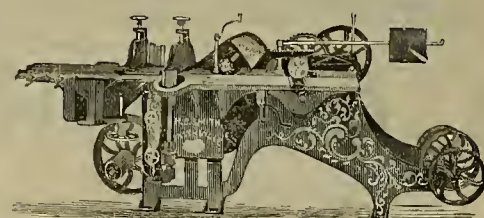
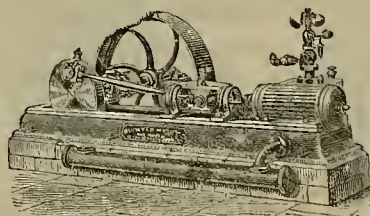
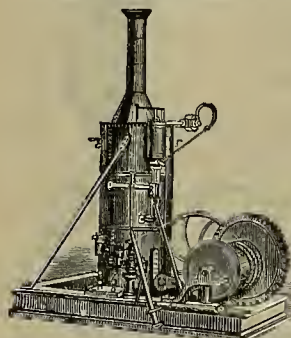
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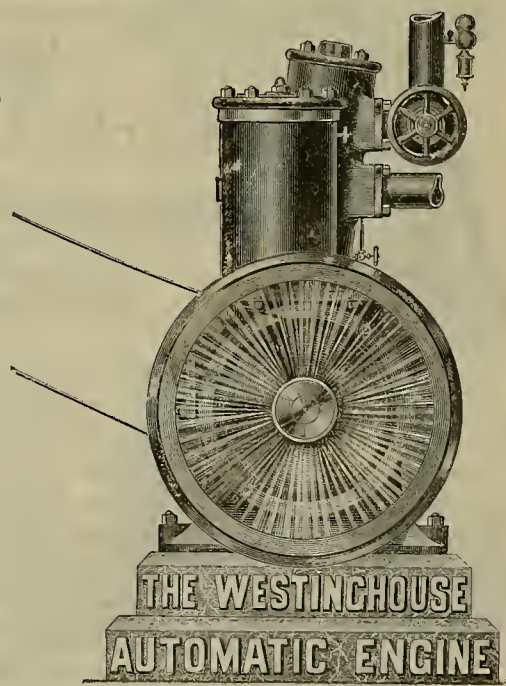
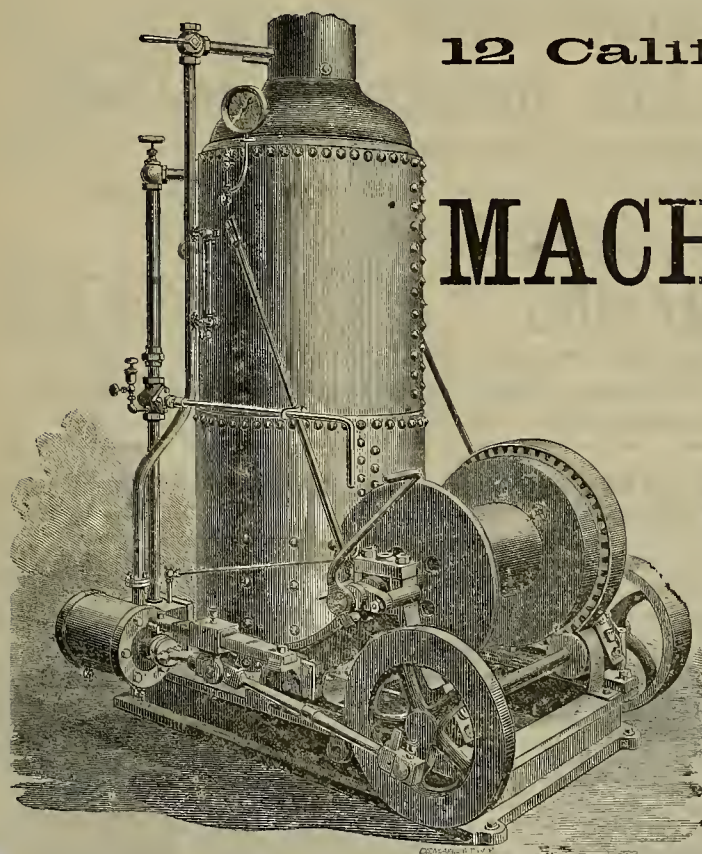
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An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, JANUARY 30, 1886.

VOLUME LII
Number 5.

Wheeler's Improved Surface Condenser.

Surface condensers are coming into very general use, both for marine and stationary engines, and the more they are known the better they are appreciated. The surface condenser differs from the ordinary jet condenser in that the injection or condensing water does not directly come in contact with the exhaust steam from the engine, and therefore does not mingle with the water fed to boiler. The distilled water resulting from the condensation of the exhaust steam is alone used for supplying the boiler, and as this water is necessarily pure, a great saving to the life of the boiler is the result, as also economy in fuel.

On land there are many places where impure or objectionable water abounds (not suitable for feed purposes) that could be utilized with great effect for condensing purposes. We refer to places located by muddy rivers, or where the water is impregnated with lime, salt, or other matter which creates scale. By the use of a good surface condenser this trouble (to say nothing of the expense and danger to boilers) can be avoided, and at the same time a saving of from 15 to 25 per cent of fuel secured. For marine service the surface condenser is now regarded as a necessity, for it does away with the expense and room for carrying a supply of fresh water. The steam that is condensed is fed directly to the boiler in its hottest condition, and so used over and over again.

In the older forms of surface condenser, the tubes run from end to end straight through the heads or tube sheets like the tubes in a steam boiler, with this difference—that the ends of the tubes are packed (as a piston rod is packed), with some material which will insure their being steam-tight, and at the same time permit them to move freely when they expand and contract.

As this packing cannot be readily adjusted, but is either tight or leaky, according as it is made, it is always a source of anxiety to the engineer. The tubes, under varying temperatures, expand considerably endwise, producing a movement called "creeping," which sometimes draws them entirely out of the tube sheets. Then, if the packings grip the ends of the tubes so tight that the leather cannot move freely, rupture, or springing of the tube heads is the consequence.

Unequal distribution of steam over the cooling surface, so that parts of the condenser are hot, while other parts are cold, insufficient vacuum, condensed steam (feed water), not as

hot as it should be, liability of the circulating water to leak into the steam space, and mix with the water of condensation, are also common faults of many surface condensers. The engraving herewith shows an improved condenser, which is the invention of Mr. Fred'k M. Wheeler, and possesses many valuable and novel features, combined with practical qualifications. Briefly stated, this improved surface condenser is claimed to possess the following advantages:

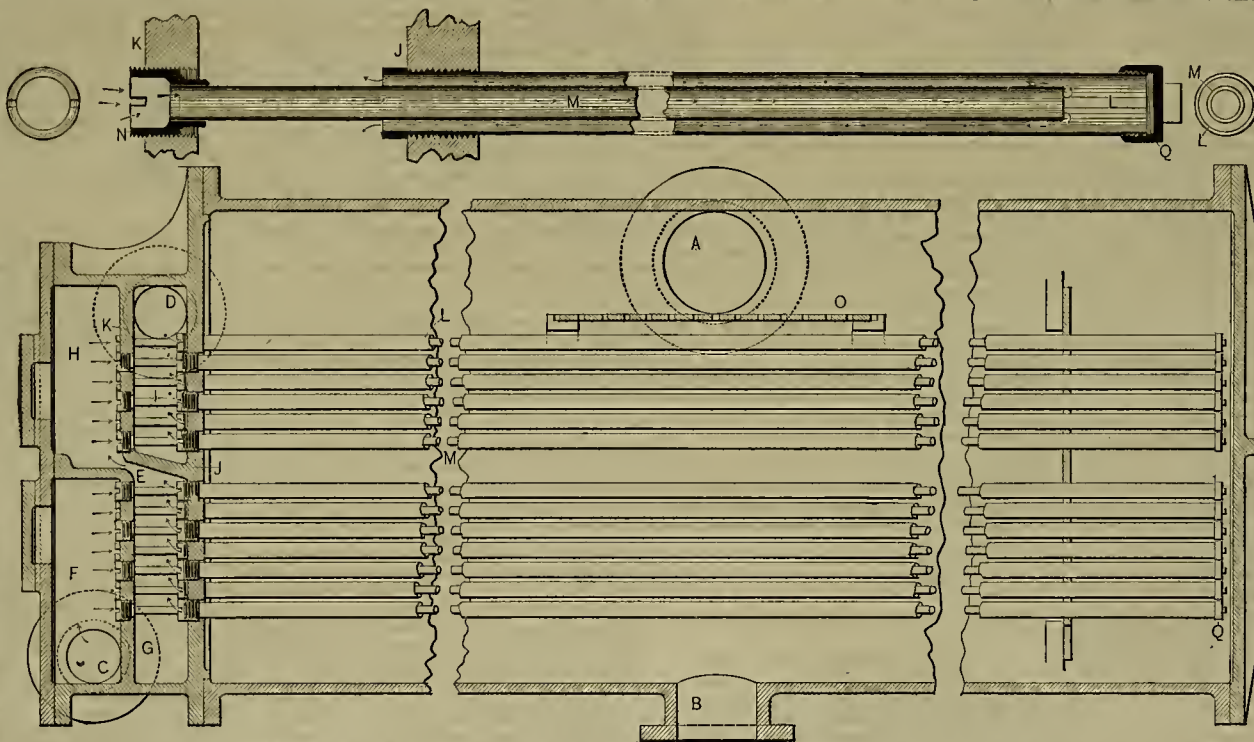
The tubes are so arranged that they are free to expand and contract without the use of

is as follows: The exhaust steam from the engine entering the condenser by nozzle, A, first comes in contact with the perforated scattering plate O, which protects the central portion of the upper tubes from the deteriorating effect of the direct impingement of the steam. The steam expanding in the spacious top of the condenser, reduces its pressure and temperature before it comes in contact with the cold tubes. The steam, as soon as condensed, gravitates to the bottom, and passes out by the nozzle B to the air pump.

It will be noted also that there is ample room

so that coarse deep threads and a slot can be cut; this latter is similar to the slot shown in N, which admits a screw driver tool for screwing up or unscrewing tubes from the tube heads. When necessary to remove the tubes for cleaning or repairs, both small and large tubes can be drawn out from the same end of the condenser. After removing the small tube the large tube is unscrewed and drawn through the hole left vacant by the screw head of the small tube, this hole being a little larger than the thick end of the large tube. As an evidence of the remarkable efficiency of the Wheeler

Condenser, we find it stated that carefully conducted tests have shown a result equal to nearly 200 pounds weight of condensed steam per hour per square foot of condensing surface, which result is something like three times greater than any previous construction of condenser has given. This is ascribed to the very effective and rapid circulation of the condensing water produced by the arrangement and form of tubes thus making more efficient, the cooling surface exposed to the steam. Messrs. H. P. Gregory & Co., 2 and 4 California street, S. F., are agents, who will be pleased to give any further in-



WHEELER'S SURFACE CONDENSER FOR MARINE OR STATIONARY ENGINES.

packings of paper, wood, or similar materials; in fact there are no ferrules, followers, washers or packings of any kind employed. Plain screw joints only are used, the simplest, most durable and efficient tube fastening possible, and always tight.

The tubes are straight, of seamless brass tubing, and carefully tinned inside and outside. They can be easily and thoroughly cleaned, as their form and the means of fastening permit of this being readily done. The tube heads do not have to be removed from the main part of condenser for the cleaning or repairing of tubes.

The pressure (and likewise the temperature) of the exhaust steam as it enters the condenser is reduced to a minimum, and then is uniformly distributed over the cooling surface. This, together with a perfect circulation of water in the tubes, produces a more uniform temperature in the condenser, making one portion as efficient as another, and economizing the amount of circulating water and cooling surface.

The water of condensation passes from the condenser at the hottest temperature possible. The circulation is very active and thorough; consequently a smaller amount of circulating water is required. This feature gives a marked saving in the capacity and power necessary to work the pump. The operation of the condenser

in the bottom of the condenser for the water of condensation, so that it cannot come in contact with the cold tubes and become chilled. The hot water therefore passes out at the highest possible temperature, according to the vacuum carried.

The circulation of the condensing or cooling water is as follows: It is pumped into the compartment F through the nozzle C and enters the smaller tubes of the lower section as shown by the arrows. After traversing the smaller tubes, the water returns through the spaces between the small and large tubes, and empties into the compartment G; from thence it passes into compartment H by the passage way E. The water then passes through the tubes of the upper section (in the same manner as described above) into the compartment I, and finally passes out of condenser by the discharge nozzle D.

The upper part of engraving shows one of the small and large tubes in section. The small tube M is expanded into the screw head N, which latter screws into the head K. This small tube ends within a few inches of the cap G of the large tube L, thereby giving ample space for the water to reverse its direction before flowing back through the annular space between the two tubes. The end of the large tube that enters into the head J is drawn thick,

formation required. This condenser is new to the coast, but where it has been used has given very satisfactory results.

MINING has not yet taken its legitimate place in the confidence of investors but it is certainly and deservedly gaining ground in this direction. Never before, perhaps, has the industry paid a better average return on the capital actually engaged in working the mines. The period of inflation in mining values has passed, and there is to-day no other industry in this country that offers so large legitimate inducement of capital as the working of prudently selected mines.

THE managers of the Peer, Peerless, Crocker and other leading mines in Quijota District, Arizona, have decided to stop all other work and explore the ground with a tunnel at a depth of 1,000 feet. The tunnel has already been started, miners having been procured who are willing to work for \$3 per day—a reduction of \$1 per day on the rate previously paid. The tunnel will speedily show whether there is any merit in these much-talked-of mines.

THE great Tintic mining case decision we shall give in full next week, as it is highly important and of great interest to miners, involving several questions which affect all lodes,

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—*Ens.*

Exhaustless Gold Repositories.

The Quartz Lodes, Porphyry Veins And Ancient River Channels of Sierra County, Cal.

[Written for the Press.]

Now that the spell of the Silver Wizard in far desert regions is waning, man of the pick and parse alike are becoming cognizant of the vast and accessible gold reserves stored up in the inde-ribbed western slopes of the Sierra Nevada, which are, as yet, practically virgin to the miner.

From the surface gleaming of detrital gold and the skimming of auriferous veins have mainly come the quickening streams that now swell the world's trade arteries.

Great as these streams have been in the aggregate since '49, they are but the advance flow of a vast treasure-tide yet to be poured from the fecund vein sources of the Sierras.

The notahs diminution of the gold-flow after the first few years of discovery was due, as is well known, to the partial exhaustion of the gold made easily accessible by the natural segregation and concentration of the metal from its matrix through immeasurable cycles of time.

What nature did for man ages before his appearance upon the planet, he must now do for himself, not in nature's deliberate way, by the slow erosion of mountain masses under elemental action and gravity, but by the discriminate exploitation with scientific appliances of the gold lode which traverse them.

Advantages of Gold Mining, Quartz Averages, Etc.

While gold mining is the most attractive, it is also one of the safest and most generally profitable of mining pursuits.

The producer of gold has especial advantages in the compact character and unvarying value of his product; nor is he ever so dependent on transportation facilities and markets as is the producer of silver and the base metals.

Moreover, the gold tracts chiefly lie in lofty and salubrious mountain ranges, which are heavily timbered, deeply eroded and abounding in water courses—conditions all most favorable to economical mining.

The reverse is generally true of the regions where silver and the base metals are most extensively won; the essentials of timber and water being nearly as precious from scarcity as the minerals sought after.

We may have, from overproduction, a plethora of silver, copper, lead, antimony, coal, petroleum, etc., even a plethora of diamonds, but never a glut of gold.

In the extraction of gold the appliances and metallurgy are usually so simple that gangue matter yielding not more than four or five dollars per ton may be, and is, made profitable under favoring conditions—a yield quite inadequate in the case of other metals.

Some of the Black Hills mines and Australian quartz reefs probably furnish the most notable examples of remunerative dividends by mill process from vein-stuff yielding no more than \$4.50 per ton.

As yet very few of our California gold lodes have been extensively worked on so low an average yield.

Amador county mines have paid generously on investment from \$7 to \$9 quartz; Nevada county (Grass Valley particularly) has distributed its millions from smaller but richer veins, averaging not less than \$15 per ton.

The Sierra Buttes mines of Sierra county, have paid dividends for twenty years to the English stockholders from quartz averaging, about \$0.50 per ton.

The Chute or Bonanza Lodes.

With this class of quartz-veins, of which the Eureka, Rocky Bar, New York Hill and other Grass Valley mines are representative, certain parts of Sierra county are thickly threaded.

These, gauged by the standard of silver or copper veins, are usually small, but there is an extraordinary concentration of the precious metal in them; for, by one of nature's kind adjustments, the low-grade lodes are generally wide, and, as a rule, the narrower the vein the richer it will be found.

Doubtless the richest and greatest concentration of these veins is in the region embraced between the Middle and North Yuba rivers, the extreme southwestern limit of which is at the Alaska and Grizzly mines, Pike City, and the northeastern at the Sierra Buttes, a distance of 25 to 30 miles.

This region is fissured by numberless ravines and canyons, all of which have been very prolific in gold, notably Kanaka creek and tributaries, from which millions have been gleaned.

Throughout this area are dozens of lodes which have yielded comfortable bonanzas by chance discovery, or in desultory prospecting thereupon; yet which, save in a few instances, have never been opened up for systematic mining.

Many of these lodes are held under location

titles from year to year, by men who lack either the means or the surgery to exploit them; and notwithstanding their extraordinary yield near the surface, by far the greater number remain unexplored to any considerable depth.

The few already known and partially developed are worthy of especial attention in view of their history, characteristics and future promise as gold producers.

Hers is an inviting field for profitable enterprise, for although there have been failures through ignorance, extravagance and rascality, and though even here the unscrupulous schemer and stock jobber has had his day and left this blight of his presence, these hills are obviously replete with gold, and whatever the haseness of man has done, or may do,

Nature Does Not Here Lie in Her Promises.

The lodes are mostly of pure quartz, in well-defined, true-running fissures lying between metamorphic schists and porphyry, or serpentine; the gold occurs in "chimneys" or "chutes" of varying extent, and is generally free, though often accompanied with auriferous pyrites, or with mispickel very rich in gold.

Extraordinary finds are frequent in the annals of this quartz zone, and a decent fortune has occasionally been thrown out by a single lucky blast.

All the ravines intersected by these lodes have been rich in rough or partially abraded gold, indicating the near-by sources; and many of the gulches have yielded largely in float gold quartz and boulders, single specimens of which have contained \$5000 or more.

Gold Product of Certain Lodes

While exact data are not at hand, I can give the approximate output of some of the representative lodes of this class in the region described, as follows:

Alaska.....	\$700,000
American Hill.....	150,000
Brush Creek.....	450,000
Docile.....	150,000
Fellows.....	350,000
Hoadley & Bowles.....	150,000
Oriental.....	450,000
Plumbago.....	200,000
Rainbow.....	500,000
Wolfe Creek.....	170,000
Total.....	\$3,270,000

Here we have a yield of three and a quarter millions from a few small mines, hardly known beyond the county limits, a considerable part of which has been obtained in desultory and haphazard working near the surface, and with appliances wholly inadequate.

In regard to the average yield per ton of the mines named, I have no reliable statistics, save in the case of the Alaska mine, the central pay chute of which the writer discovered and worked to a depth of 260 feet in 1869.

A considerable length of surface ore on the Alaska, east of the main shaft, yielded \$35 to \$40 per ton.

Some 1600 tons worked in a five-stamp mill from the central pay zone yielded \$39 per ton by simple battery amalgamation, and returned the partners at that time, \$10,000 each, beyond outlay.

But the golden reserves of Sierra county are not limited to this class of narrow, high-grade quartz veins. Low-grade gold lodes of great width are numerous, and, in the main, well situated for economical exploitation and water power reduction.

These are yet undeveloped, for the surface sluicing and "coyoting" of local prospectors cannot be considered a development, nor even a practical test.

Porphyry Veins and Dead Rivers.

This part of the county also abounds in porphyritic veins or dykes, locally and erroneously called "tale" veins, which cleave the foundations, and are apparently as well walled, regular and persistent as the quartz lodes. They are often quite rich, and in their disintegration have furnished a considerable part of the detrital gold of certain localities. The gold occurring in these veins is found associated with the quartz and ferruginous stringers which interlace the gangue stuff from wall to wall. These deposits are worked in favorable or specially rich spots by ground sluicing, the vein material being usually decomposed to a considerable depth.

Doubtless many of these, if opened and equipped for extensive operations, at points where water-power is abundant, can be made highly profitable mines.

This rich section of California also holds other very important gold sources in the deeply buried ancient rivers of the Pliocene epoch, whose lava-crust channels lie athwart the present drainage system.

These constitute the deep drift diggings, which have their most salient representation and development at and in the vicinity of Forest City, and which, in extent, permanency and productivity rank next to the lode mines.

Of this class the Bald Mountain mine alone has yielded some two and a half million dollars, 50 per cent of which has been disbursed in dividends.

To the shrewd man of means desiring safe and profitable business, or investment, beyond the reach of economic convulsions, the fluctuations of markets, the fierce rivalries of trade and the hazard of stocks, in a climate unrivaled for salubrity, one of these gold mines, secured by United States patent and managed on business principles, offers all he could reasonably desire either for immediate revenue or for a future reserve.

MILES FAUSON.

Measuring Silver Globules.

[Written for MINING AND SCIENTIFIC PRESS by C. H. AARON.]

EDITORS PRESS:—In your issue of the 9th inst., is an article on measuring globules of silver, which, though literally correct, contains that implied error which is to be found in nearly all, if not all, the literature on the subject, not only of blowpipe work, but of volumetric determinations in general. The error consists in conveying the impression that certain fixed dimensions of the apparatus are essential.

In my book on assaying bullion I have explained that it is not necessary that the pipette used for the normal solution in the humid assay of silver should contain exactly 100 C. C., as usually implied. In assaying gold and silver ores I have stated that the weights used need not conform strictly to any particular standard, provided they are correctly proportioned in known ratio among themselves, and I now come forward, in behalf of young, and perhaps poor students, to show that a Harkort scale for measuring silver globules need not be so constructed as that "at this distance of exactly six inches" from the point of intersection "they are precisely .04 parts of an inch apart," which, with the implied necessity of dividing the six inches into precisely 100 equal parts, might well discourage a boy from attempting what he may easily do, namely, make a scale for himself.

Many years ago I was somewhat of an enthusiast in blowpipe work, especially in quantitative assaying of gold, silver, lead, copper, tin, bismuth, nickel and cobalt. I made my own apparatus in great part, and among other things I made four measuring scales, two of which I still use on occasion, and neither of them were six inches long, nor do I yet know the precise divergence of the lines, which was not the same in any two of the scales.

I bought a piece of ivory, sawed it into strips about five inches long and less than a quarter inch thick, smoothed and polished them by coarse and fine sandpaper, and finally by chamois leather, chalk and oil. Dressed the point of a good penknife on an oil stone by the aid of a lens. Made a straight edge from the base plate of an old thermometer, by grinding it on a marble table. Laid the straight edge on the ivory and drew the point of the knife along it. Swung the straight edge slightly on a point near one end of the ivory, and made another stroke of the knife. Rubbed lamp black into the cuts, and examined the lines in a strong light with a lens, found the lines defective, worked them out with sandpaper, etc., and made them again and again until they were good.

Using the same straightedge, not moving it except to rotate it slightly on a given point, any little inaccuracy in it was harmless, as the two lines were alike. Aided by sunlight, lens, good eyesight and patience, sought the extreme point of the strip of ivory between the lines. This is what is required; not the point of intersection of the centers of the lines, but that of their inner sides, for the lines, however fine, have breadth, and the globule is to be placed between them. Having found the visible extremity of the space between the lines, and allowing about the thirty-second of an inch for the small portion inevitably torn off, I made a mark by means of the knife and lamplack; then, with a pair of fine-pointed dividers, set to approximately the hundredth part of the length of the scale, I walked off 100 equal spaces from the mark toward the divergent ends of the lines, pressing so as to make little holes, into which I rubbed lamplack. At each dot thus made I drew a fine line crossways, but not intersecting the side lines. In this way, working a couple of hours daily for three weeks, I made four scales, one of which was pronounced by Mr. Rhien, the assayer, to be the most perfect he ever saw.

I had then to find the weight of the gold or silver globule corresponding to the marks on each scale. This was done as follows: A piece of pure gold was melted with some pure lead and cut into about a dozen pieces. Each piece was cupelled by blowpipe in a cupel of levigated bone ashes. The beads thus got were so large as to be measured near the open ends of the lines, consequently they could be weighed on a fine assay balance. Each bead was measured, and the number of the division on the scale noted. Each bead was then weighed separately and its weight noted. All of the beads were then weighed together and the difference between the total weight and the sum of the separate weights was divided into as many parts as there were beads, and the weight of each corrected proportionately.

The number of the division on the scale corresponding to each bead was then cubed and divided by the corrected weight of the bead (in half milligrams, but any other system would answer equally) the result was, approximately, the weight of a gold bead which would measure 1 on the scale. Of course the different determinations varied; extreme variations, of which there were one or two, were rejected, and the mean of the others was taken as the absolute weight, in half milligrams, of a bead measuring 1.

The value of 1 on the scale being thus found is a factor by which to multiply the cube of each succeeding number on the scale, giving the weight of the bead of corresponding diameter. I made a table of these weights.

In order to form a table for silver globules,

it is not necessary to go through the same process. If the forms of the silver globules were the same as those of the gold, the relative weights might be found by the specific gravities of the two metals, but Plattner found that gold globules were slightly less flattened than those of silver. That illustrious blowpiper has given us the relative weights of gold and silver globules of equal diameter, as found by careful experiment as follows: As 1.4 is to 3, so is the weight of a silver bead to that of a gold bead of equal diameter. The weights for gold having been found as described, those for silver may be calculated by this rule.

I prefer gold beads for the determination of values on the scale, both because they are heavier and, consequently more accurately weighable, and because, owing to their color, they are also better to measure. The principle of the scale consists in the well known mathematical law that "the solid contents of similar bodies are as the cubes of their similar measurements." The flattening of the beads on the under side would not cause any error if all were flattened proportionally alike, but the larger ones are more flattened than the smaller, yet, within the legitimate scope of the instrument, the error thus caused is not important; nevertheless it is better to weigh those beads which come near to the wider end of the scale, if a delicate balance is at hand.

In regard to the assay of gold, though it is susceptible of sufficient accuracy for some purposes, it cannot be as close as that of silver, owing to the greater density and higher value of the metal. The parting is best done in a minute porcelain basin, and, if the gold falls to powder, it is collected and washed on a very small filter which is then dried, dressed with some pure lead and borax, and smelted on charcoal, the button being cupelled on an extremely fine cupel and measured on the scale. I have found it best to wash the gold with ammonia instead of water, as either the water or the filter is liable to retain a little silver, rendering the gold bead impure.

For handling minute beads, a watchmaker's fine pinnettes are best. The spring should be weakened by filing, and the points dressed under the lens, on an oilstone so that the ends are perfectly square and the jaws close parallel, in order that the bead may not jump away. Users of ready made scales should check them by measuring a number of beads and then weighing them all together on a good balance. I have found a Lingke scale 15 per cent too high; probably the dry climate caused it to shrink.

Many assayers denounce the quantitative assay of silver by the blowpipe as worthless; perhaps it is so in their hands, but I have found it useful for rapid approximative work on ore and tailings in milling, and in prospecting it is invaluable, if one has the means of weighing a decigram of ore within one per cent, and such means are easily improvised with a bit of tin sheet, a slip of wood and a couple of needles.

I cannot close this without the remark that Forbes' (?) blowpipe assay of silver, as described in Crooke's edition of Mitchell's Manual of Assaying, differs in no essential respect that I can see from the method taught by Plattner many years earlier.

USE OF ROCK DRILLS.—In speaking of Shaft No. 3 in the Ontario mine, Park City, Utah, now down 1000 feet, the Salt Lake Tribune says: The rock here, as for the last hundred feet, is exceedingly hard quartzite. It would be nearly impossible to sink it at all by hand-drilling. In sinking four machine drills were used and three sinking shafts. It was man contending against nature at all points; in fact, it has been so almost from the very first in the Ontario, but man, directed by intelligence and man possessing nerve and sticking qualities, the net result of the apparent confusion in slauting of drills, hammering and blasting and whatever else made a din, has been peace and dividends with the men who have directed this great work. But it may well seem wonderful to the spectator. Man will dig his hole a thousand feet deep and cut out chambers as big as two story houses in the flint-like rock. He will hold the subterranean geyser at bay and keep the walls of his rock house from crushing him. He will make a dry house down there for his ponderous pumps, and set the power of a thousand horses to lifting water and rock. Then he will burrow out the ores and turn them into money. It is all in knowing how and having the means.

THE CRESCENT CONCENTRATING WORKS.—In 1884 the company constructed a tramway five miles long, to bring the ore down to the sampler and concentrators. The concentrator is located at the lower end of Park City, close to the creek and partly in the bank on the east side. A tramway on that side dumps ore on an ore floor, capable of storing seven or eight thousand tons. Another tramway runs into the mill, where ore is dumped into chutes connecting with a large Blake crusher, from which it passes through screens, the coarser portions going through very large Cornish rolls. The balance of the machinery consists of five screens running from 4 to 40 mesh in size, after which five jigs complete the operation of condensing about five tons into one. The average is exactly four and eight-tenths to one. The concentrator thus obtained go about 50 per cent lead and 26 ounces silver. The machinery is operated by a 50-horse power engine.

MECHANICAL PROGRESS.

The Railway Sleeper Question.

The question of railway sleepers, is constantly increasing in magnitude and importance. Much investigation has taken place, many experiments have been undertaken, and numerous exhaustive reports have been made to furnish the needed data for conclusions, and still the question is an unsolved and a much vexed problem.

The Vast Supply Needed.

Confining our attention to the railways of our own country—the total length of track in the United States is set down in round numbers at 150,000 miles. Assuming the average durability of ties to be seven years, and the distance apart three feet, there will be 2640 to the mile, making the total number in use 396,000,000. Estimating one-seventh to be replaced every year, the annual demand to keep up the present railways will reach 56,571,428. Supposing that an acre will supply 100 ties—a liberal estimate—it will require 565,715 acres annually to furnish the ties required by the existing lines of railways. For each mile of railway there will be an annual demand for 377 ties. It will require 30 years, on an average, for trees to grow large enough for making cross ties. The acres that must be kept in timber and growing will be 16,971,420 for supplying ties to the railway lines now in existence.

The increase in railway mileage, estimated by two decades, is about 4150 miles annually. To construct the railways that will probably be built in the next ten years, 109,560,000 ties will be demanded, the product of 1,095,600 acres of woodland. Allowing 30 years as the period of growth for ties, this would add 3,286,801 acres to the timber reserve for railways alone, making a total of 18,905,579 acres as the needful reserve. Evidently this question is one demanding reach of statesmanship and a careful preservation of our present timber supply.

Relative Value of Woods for Ties.

Elaborate investigations have been made in regard to the relative value of the different kinds of wood for ties—their durability, cost, resistance to pressure, etc. It has been found quite difficult to arrive at conclusions in this regard, from the fact of the great diversity in cost, resistance to pressure and durability—some being very durable but too soft to resist pressure; others being durable, but costly, etc. Cedar is found the most durable, but too soft. The California redwood, all things being considered, seems to stand the best test; but the fact that this wood has been used only on the Pacific Coast, in a dry climate, militates against experiments in this direction being a fair test as against some Eastern woods. Then again, the growth of the redwood is very slow. Fifteen-year-old trees have a diameter of only ten to twelve inches, and such trees will only make three ties, seldom four, and when younger the wood is not durable. It is said that the Santa Cruz redwood is the most desirable, as it is much heavier and denser than the redwoods grown further north. Cypress comes next to redwood in durability, then some of the hardest oaks, pine, chestnut, hemlock, tamarack, elm, ash, etc., in the order named.

A Pleasant Prospect for Ironmasters.

The time is evidently not far distant when one of the largest items in the construction and maintenance of a railroad plant will be its sleepers or cross-ties. The vast acreage, as some set it forth, required for the present supply of wooden ties, and the immensely increasing area which will be called for in the early future, seems to point most unmistakably to the necessity for a change from wood to iron or steel. Stone, for reasons not necessary to discuss here, seems to be ruled out by general consent. The vista which such a change opens up to the ironmasters of the world is beginning to be dilated upon in quite glowing terms, and affords a pleasant prospect to the early future of our iron interests generally. As already intimated, the relative cost of iron or timber is not yet conclusively settled, but the cost of the supply of the former is so constantly declining and that of the latter so regularly increasing, that they must soon meet on a common level and pass on to the advantage of the former.

The Question of Iron or Steel Sleepers

Is much nearer to a practical solution in Europe than in this country, owing to the greater scarcity and higher cost of timber there, as well as the lower cost of iron and steel. There seems to be a very great probability that the railway managers of Great Britain will soon resort to iron or steel. We note progress in this direction as follows:

Iron Sleepers for India.

The Anderson Foundry Company, Glasgow, have received a large order for cast-iron railway sleepers from Calcutta.

The Darlington Iron and Steel Company are laying down a plant for the production of steel sleepers, and they anticipate being soon able to accept orders from English lines. This concern and others who are preparing to enter the sleeper business note with satisfaction that the Belgian Technical Railway Commission has just pronounced in favor of experiments on large scale with steel sleepers. Quite a number of practical experiments with iron sleepers are now in progress on various English railways, and it is claimed that

Yearly One Hundred Thousand Tons

of steel sleepers would be needed upon the railways of the United Kingdom if as many had to be relaid with the metal as have now to be relaid with timber, since the mileage relaid year by year in the three kingdoms is one thousand. To pay for the material now being employed in this work, about a quarter of a million sterling has to be annually sent to Russia, Norway, Sweden and Canada together. The British iron makers are offering great inducements to the railroad companies in the way of low prices, to make the change at once, and they make no secret of the fact that they have out it painfully fine to encourage the railway companies to discard timber. The lumber dealers are also wide-awake in the matter, and are supplying timber sleepers at an almost ruinously low cost. Taking it altogether, the railway people have a prospect of low prices for a long time to come in this important article of maintenance.

Still Experimenting.

It seems that the want of entire success with steel sleepers on some of the English railways has led to the substitution of an article which, it is thought, will meet the deficiencies hitherto experienced. According to the new system, the metallic sleeper is rolled to the requisite trough-like section. Under each rail is a sole plate to strengthen it there. The chair is formed of two jaws made of steel plate, stamped into form and ribbed centrally, so as to give strength to resist the pressure of the wedges. The jaws, sole plate and sleeper are united by rivets passing through the three thicknesses. The iron sleepers that these are intended to take the place of were inefficiently elastic and did not rest sensibly, but, being seriously weakened by the large holes necessitated by the character of the fastenings, and these holes being situated on either side of the rail just where the strain on the sleepers was greatest, the latter were continually breaking there, thus rendering it obvious that the acknowledged advantages of metal sleepers must be realized under an improved system.

NEW MECHANICAL CONSTRUCTIONS.—However correct the original designs of a complicated machine appear on paper, practical experience teaches that small modifications are required in the details, before perfect accuracy of action is secured. Capitalists who engage in the manufacture of, or invest in new devices, and do not take into account the delay and expense due to this cause, find their estimates sadly out of gear. It is seldom that even the simpler mechanical inventions, when essentially different from machinery previously in the market, work to entire satisfaction at once, even if the most skillful designers have made the plans. Many a fabulous profit, expected to be realized already within the first year of the investment in the special mechanical device, is wrecked on this shoal or is at least seriously diminished in its proportions. Of course men of experience always realize this risk, and make some kind of allowance for it; but those who invest wildly in engineering devices, and especially the novices, have their tempers not a little ruffled by this experience, and are too ready to blame the engineers and machinists for what seems, in the nature of things, to be an inevitable accompaniment to the manufacture of essentially new mechanical constructions.—[*American Engineer*.]

MECHANICAL GLASS BLOWING.—Messrs. Appert have devised a process in their factory at Clichy in which they use air stored under great pressure, so as to dispense altogether with the necessity of blowing by the mouth. Glass-blowers are peculiarly susceptible to various disorders, such as diseases of the lips and cheeks, and predisposition to tumors and rupture. These affections are the more serious because boys are often employed, when the system is weakened by rapid growth. The high temperature and dry atmosphere increases the unfavorable hygienic conditions. The new process entirely suppresses blowing by boys, and, with rare exceptions, by adults also. The manufacture of glassware is thus ameliorated by rapidity of execution, as well as by the perfection and the large size of the pieces which are produced.

NAILS FROM OLD STEEL RAILS.—B. Lauth, of Howard, Pa., has patented a method of forming steel nail-plates directly from old steel rails. Old worn-out Bessemer steel rails are rolled down to small sized strip, hoops or nail-plates. These plates are placed in a closed box to protect them from the action of the atmosphere, and are heated in a furnace to a white heat. The furnace fire is then allowed to cool down to permit the gradual cooling of the plates. The plates are said to possess the qualities of ductility and softness to a high degree, and to thus form nails of a superior quality. The plates should not be exposed to the air until they have cooled in the box. If a very high white heat is attained there would be danger of welding the plates together, and such high heat should therefore be avoided.

AMERICAN WHEELS IN ENGLAND.—The recent demand in this country for English horse-cabs has disclosed the fact that the wheels imported there are of American make. Buyers here have actually paid the cost of freight to and from London, and duty on their reimportation of these articles manufactured in their own country.

SCIENTIFIC PROGRESS.

New and Important Discoveries.

Quite recently a large number of new discoveries, some of them of large importance to the arts and industries, have been made through the studies and researches of scientists. First in order, we may mention that of a cheap process for

The Manufacture of Sodium.

The need of some cheap process for the manufacture of this hitherto high priced material has long been felt; and now comes the assurance that that want will soon be supplied. M. Losier, of Lyons, France, announces that he has discovered a cheap means for this manufacture by an electrolytic process, by which he will be enabled to furnish the product at a very low figure—a mere fraction of its present cost. Such a low figure of production will insure a very large demand for the material, especially for use in mining and all other industries where quicksilver is largely employed.

The process of M. Losier, it appears, consists in decomposing chloride of sodium by an electric current at a temperature of 90° Centigrade. It is stated that by this process it requires but three pounds of salt to produce one pound of sodium. The only expense attending the manufacture is the cost of fuel for heating and melting the salt, and the cost of producing the electrical current. The cheapest quality of salt can be employed; hence the manufacture of sodium may be made very cheap at any point where cheap salt and cheap fuel meet. Salt, either rock or marine is absolutely inexhaustible. This discovery will add a new factor to its value as a cheap raw material, and open a new field of research for other possible discoveries of great value to the industries of the world.

The New Hydrogen Manufacture—Water Gas Possibly as Cheap as Natural Gas.

The recent communication of M. Felix Humbert and M. Henry to the French Academy of Science, in regard to the new method of producing pure hydrogen and of making water gas at an extremely low cost, has caused much anxious attention, not only in France, but all over Europe, and in this country as well. If the process which these gentlemen have described marks a new departure in gas-making, the matter is of weighty import, not only to the gas manufacturers, but also to the coal owners and iron masters. It will affect in no inconsiderable degree the consumption of coal, and modify some of the processes of iron manufacture. In this process a jet of superheated steam is directed into a retort filled with incandescent coke. The oxygen unites with the carbon to form carbonic oxide, and hydrogen is liberated. Up to this point there is nothing new in the process. But now these gases are led away to a second retort filled with lumps of some refractory substance maintained at a red heat. The use of refractory materials is to expose a large surface to the incoming gases. Into this second retort there is led at the same time a jet of steam superheated to the point of dissociation. The oxygen of this steam unites upon the carbonic oxide to form dioxide, and more hydrogen is liberated. To remove the carbon dioxide the gases are passed through milk of lime, and the pure hydrogen is led away to the reservoir. The authors of the communication say that one ton of coke produces about 96,000 feet of gas, which is about eleven times the quantity obtained from a ton of coal, which reduces the cost of the gas to a very low figure—very little indeed, it may be supposed, above the cost of natural gas, when the difficulty of controlling that gas is taken into account. It is easy to see the numerous applications of such a gas for heating purposes; but the inventors have arranged to make a start with it for lighting. How the carburation is to be affected is not stated, but it is announced that the little town of Boulogne-sur-Seine is to be lighted with this gas during the winter.

New Source of Citric Acid.

It has recently been ascertained that large quantities of citric acid may be extracted from the fruit of the cranberry, which contains $\frac{1}{3}$ to $\frac{1}{4}$ per cent of the pure acid, accompanied by one-quarter to one-third per cent of malic acid; but the quantity of the latter is said to vary in different localities; and it diminishes as the fruit becomes completely ripe. A certain quantity of malic acid is, however, always present. The manner in which Groeger extracts this acid from the German cranberry is as follows:

The fruit is ground in a mill and pressed to obtain the juice; the residue is treated with water and subjected to pressure three times more. The first operation yields 57 per cent of free acid. The liquids being all united are treated with a solution of gelatine, which precipitates all the tannin. The precipitate is very abundant, but is soon deposited. Having ascertained by a test made upon a small portion of the clear liquid, how much carbonate of lime is required to saturate it, this quantity is added to the whole of the solution decanted (not filtered) from the precipitate of tannate of gelatine. When the entire liquid is perfectly saturated it is heated until it boils. The boiling causes citrate of lime as white as snow to be deposited, and this being collected and stained in the usual manner is decomposed by the action of sulphuric acid at 10 per cent.

In carrying out the latter operation it is also

important to ascertain, by a previous test made upon a small quantity, the exact amount of diluted sulphuric acid requisite to effect the decomposition of the citrate of lime. From 1 to $\frac{1}{4}$ per cent of pure crystallized citric acid can thus be obtained from the fruit of the cranberry. The red coloring matter appears to be entirely got rid of with the tanning, as the citrate of lime precipitated by boiling is perfectly white.

New Process for the Manufacture of Chloroform.

A new process for the manufacture of chloroform has just been patented in this country. It has caused quite a revolution in the trade, and bids fair to place the manufacture of the total annual consumption in the United States, which may be estimated as 300,000 lbs., in the hands of the patentee. Although a number of large firms have been working to obtain the same end, viz., the cheap production of chloroform, it has been the good fortune of a scientific gentleman in Albany to perfect the process, and he will thus reap a large pecuniary reward as the result of much labor and patience. A description of the entire process of the manufacture is before us, but it is too lengthy and technical to be given in these columns.

THE PHONOGRAPH TO BE IMPROVED.—Mr. Edison, the inventor, has resumed work on the phonograph, and is now engaged in perfecting it so that he can bring it into everyday use as is the telephone. Mr. Edison has not given the phonograph any attention since 1878, when he gave himself up wholly to making his electric light invention successful. He is now building a phonograph with a five-foot wheel to be driven by steam. The sound will be transferred from the phonograph to a wheel 40 times its diameter, the sound being thus amplified 40 times louder than the human voice. It will have a funnel 30 feet long. If placed on top of a building, Mr. Edison claims that a person standing two blocks away will be able to hear it talk plainly. He has also got so far as to make the machine say "Ah" distinctly by means of many wave lines.

Mr. Edison said: "After I get this machine perfect I will construct phonographs for office use, to take the place of stenographers and type-writers. All you will have to do will be to hand it to the office boy, who, by touching a spring, can make it repeat or talk back all that you have said to it and transcribe at will. Then again, you can have one at home, and when a thought strikes you all that is necessary is to talk it at the machine, and you have it boxed up for next day. I have no doubt that it will be a great success."

THE SUN'S CORONA.—Signor F. Tacchini, the successor of Signor F. Secchi, at the observatory of the Collegio Romano, has published a confirmation of the astronomer Forel's statement that the sun's corona is, in a clear sky, discernible on high mountains in a very distinct manner. He himself observed the phenomenon from the summit of Etna at the beginning of July. At Rome, Naples, Messina, Catania, the sun appeared surrounded by a broad white crown; but from the top of Etna, 3300 meters above the level of the sea, in a very clear sky it presented the appearance of a white ring surrounded by a splendid copper red corona. Near the horizon, the sun's appearance changed into an ill-defined arch of great span. He was able to observe all these phenomena at leisure on two different days. At sunrise and sunset he saw clearly the beautiful red light of the arch. But he is of the opinion that those appearances are not as strong and brilliant this year as in 1883 and 1884.

EFFECTS OF OIL OF LEMON ON CORK AND ITS PHILOSOPHY.—Corks stoppering bottles or cans containing oil of lemon will become bleached after being in use for some time. Why this occurs is met by the following explanation, which may be of value to consumers: Essentials of the nature of oil of lemon, which are free from oxygen when pure and fresh, are gradually affected by exposure to air, some oxygen being absorbed while a peculiar resin is formed at the same time. Oil of turpentine is a familiar example of this. Oils of orange and lemon undergo this change, and gradually become so altered that they lose their specific odor and require an odor and properties resembling that of common oil or turpentine. This oxidizing action, however, is accompanied by a development of ozone, and it is the latter which bleaches the corks. When the cork of an oil of lemon bottle shows signs of being bleached, it is high time to examine the condition of the oil. It will then probably be on the road to destruction.

EFFECT OF HIGH PRESSURE ON FERMENTATION.—In continuation of previous experiments on the effect of high pressure on low organisms, MM. Cretes and D. Cochard state that the vitality of *tortula* is not destroyed by a pressure of 300 to 400 atmospheres continued for several days. Examination under the microscope shows no perceptible change in the form or appearance of the cells, and when afterwards brought into contact with saccharine solutions they multiply and otherwise behave in a normal way. Under the same pressure alcoholic fermentation always takes place after some time. When fermentation occurs under high pressures, the development of carbonic acid appears to ensue under special conditions of molecular equilibrium.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO:

Saturday Morning, Jan. 30, 1886.

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Passing Events.

The long-continued storm has been a drawback to most operations for a few weeks past, though in some localities the miners have profited by it, in allowing the flowing water to wash the gravel. Of course river-bed mining had to stop when the water rose.

There is so much more now stored in the mountains, that there will be an abundance of water for mining all the coming summer.

The newly-discovered gold district in Southern California is attracting attention, but so far very little is known concerning it that is at all definite.

The region of country down along the lower end of the Carson and Colorado railroad, in Nevada, is being much enlivened by the recent mineral developments thereabouts. It is probable that there will be a good many more men in that part of Nevada in this spring.

Hydraulic Tables.

The series of articles now being published in the MINING AND SCIENTIFIC PRESS on "Practical Hydraulics" contain a great deal of very valuable information for users of water. Mining men particularly will do well to preserve their copies of the PRESS, or purchase the whole in book form. The set of tables given on page 82 this week is specially useful to water users. By these tables any one can tell without mathematical knowledge how much water a pipe of given size will deliver on a given slope. The tables have been worked out from smallest

to largest pipes, and from slight slopes to heavy fall. In the description of the application of the tables the method is plainly given. A great deal of work has been gone over to tabulate this matter, every example having been worked out and proved. They save a great deal of calculation. These tables alone are worth the subscription price of the PRESS, or of the compiled hook form. Miners can use them without the assistance of mathematicians or engineers. They give the velocities and quantities of flow in clean iron pipes due given slopes and diameters, and are very comprehensive and complete.

Plumas County Mines.

Aside from the extensive property of the Plumas-Eureka Company, which has just completed a season's work satisfactorily as usual, the greatest interest in the quartz mines of Plumas county is, at present, centered in the mines near Greenville, at the head of Indian valley. In the large mountain west of the valley, and within a few miles' radius from the town, the principal mines are located. Of those from which ore has been recently or is now being milled with good results, may be mentioned the following: Cherokee, 20 stamps, and hoisting works; Acadia, 10 stamps; New York, 10 stamps; Indian Valley, 24 stamps, and hoisting works; Taylor-Plumas, 10 stamps; Crescent, 18 stamps, and hoisting works; Green Mountain, 92 stamps; making a total of 184 stamps.

There are also several properties in different stages of development from which ore is crushed, from time to time, as custom ore. Altogether, the prospecting done in each mine has demonstrated that the mountain is a mass of quartz veins of wonderful extent; and the various owners are beginning to see the wisdom of combined effort to develop their properties by deep adit tunnels, that will tap the ground at some depth. With this point in view, several claims have been recently combined to form a strong company, and a tunnel is now being pushed to develop all simultaneously. The same plan will undoubtedly be followed in the opening of other claims now soon to be commenced. The natural contour of this quartz district offers much to facilitate this plan of working, for the claims lie close together, the mountain side is very steep, and the supply of water and timber is both accessible and abundant.

In every instance where capital has been wisely applied in developing the mines of this locality to a reasonable depth, the veins have proved permanent and of increasing richness. This has been shown to be eminently the case with the "Indian Valley and Union Consolidated mine," which is now paying handsomely from a point lower than any in the previous history of the mine. This company has spent during the past season over \$50,000 in permanent improvements, among which may be mentioned the addition of power drills, run by water, and new water-power machinery for pumping and hoisting.

The property of the Green Mountain Company pursues the even tenor of its way, its 60-stamp mill being one of the finest in this State. Air drills have been in use at this property for some time past. They are used in the stopes and in the main drift, which is now in over 4000 feet, and is still being pushed ahead.

As if to equip the gold-hunter with all the requirements of his calling, nature has placed on the top of the mountain, far above the mines mentioned, a small valley, which has been converted into a reservoir by the Round Valley Water Company. By means of a ditch around the last slopes of the mountain, water-power is made available for all the mines now developed, or that may be hereafter, the great height affording immense power from a relatively small amount of water.

The result of the last year's work in this district is considered highly satisfactory and encouraging. There has been a generous outlay of capital, in the one instance mentioned, and the results are correspondingly gratifying. Other mines that have been lagging somewhat, from the lack of sufficient capital, are gradually getting into better shape. Business men and property owners have confidence that the dullness of the past two or three years is being shaken off, and are still firm in the belief, often expressed, that the Greenville district is "not half prospected."

Quicksilver Mining in California.

Although quicksilver mining in this State is by no means in as flourishing a condition as it was some years ago, on account of the low price of the product, yet there is considerable production. In 1885 we produced a total of 32,073 flasks of mercury, of 7½ pounds each, against 31,913 flasks in 1884. Of this by far the largest portion came from the New Almaden mine, in Santa Clara county. This mine produced 21,400 flasks in 1885, against 20,000 in 1884.

Other California mines produced as follows in 1885: Etna, 1309 flasks; Napa Consolidated, 2197; Great Western, 3469; Guadalupe, 35; New Idria, 1144; Sulphur Bank, 1296; Redington, 385; Great Eastern, 446; various, 392; total flasks, 10,673. This, adding the 21,400 flasks produced by the New Almaden, makes the grand total 32,073 flasks. The lowest price of the product per flask in the year was \$28.50, and the highest \$32.

The New Almaden mine is quite a remarkable one, and is the most important of the quicksilver mines of the United States. A statement of the earnings, expenses, etc., for 15 years, ending Dec. 31, 1885, under the management of J. B. Randol (to whom we are indebted for these statistics), shows the magnitude of the operations.

Quicksilver produced, 299,522 flasks, average value, \$35.1204.....\$10,529,851 70
Miscellaneous..... 590,521 20

.....\$11,120,372 90

Pay rolls.....\$4,747,932 67
Miscellaneous and taxes..... 678,687 38
Materials consumed in operations of mine and furnaces, 1,513,017 21

.....6,939,637 26

Profit balance.....\$ 4,180,735 64

This profit balance is accounted for as follows:

There have been expended for improvements and repairs \$885,354.25, as below (since 1872 all repairs have been included in current expenses):

Furnaces and condensers.....\$200,499 96
Hoisting works, machinery, pumps and shafts..... 442,681 37
Houses, sheds and shops..... 74,162 31
Flumes, water works, ore cleaning floors, roads and other surface improvements..... 69,010 61

.....885,354 25

Add: Real estate purchased.....\$ 14,500 00

Legal expenses and patents..... 38,469 62

"Black" debt of 1870..... 9,342 68

.....62,312 30

Profits expended in California.....\$947,666 55

Accounted for by increase in personal property accounts in California and consignments abroad..... 147,523 72

Total profits accounted for in California.....\$1,095,190 27

Profits remitted to New York office..... 3,094,545 37

Total profits accounted for.....\$4,180,735 64

Profits sent to New York as above.....\$3,094,545 37

Funded debt and dividends paid in New York as per annexed statement.....\$2,434,442 80

Interest on funded debt, taxes, legal expenses, etc..... 690,102 57

.....\$3,094,545 37

The company now has neither funded nor floating debt.

Principal of Funded Debt and Dividends

Paid in New York.

First mortgage gold bonds (paid June 1, 1873, interest 7 per cent.).....\$ 500,000 00

Second mortgage gold bonds (paid July 1, 1879, interest 7 per cent.)..... 1,000,000 00

.....\$1,500,000 00

DIVIDENDS.

\$9.25 on 42,913 shs. preferred,

\$2.25 on 57,087 shs. common,

August 4, 1881.....\$525,391 00

\$6.00 on preferred stock,

\$0.40 on common stock,

May 3, 1882..... 280,312 80

\$8.00 on preferred stock,

February 20, 1884..... 128,739 00

.....934,442 80

.....\$2,434,442 80

Mining on the Klamath.

Hydraulic mining work on the Klamath river is somewhat different from the conditions in Butte, Plumas, Sierra and Nevada counties. There they are nearer centers of civilization, and have some mail facilities. At Big Bend, up in Humboldt county, the mail only reaches the miners by mule-back occasionally, like the "grab." Everything brought in there is taken in by pack train from Arcata or Eureka, 65 or 80 miles distant, and that only at certain times, for the trail is not always open.

Nevertheless, the Klamath region is the hydraulic miners' country. No complaint can ever be made about debris or other mining ma-

terial from the Klamath river, as it is a canyon from its source nearly to its mouth in Del Norte county. There are many opportunities on this river for mining capital to develop the hydraulic mines, gravel and water awaiting the first comer, but the stranger would hardly know where to look.

The above items were sent us by one of our oldest subscribers, who sends in his subscription for the current year, and says: "I think I have had every number of the MINING AND SCIENTIFIC PRESS from a few months after this first number was issued. I first gave my subscription to our old friend A. C. Kuox, when living in Sacramento in 1865. I had previously taken it from the newsdealers."

Mexican Mining Labor.

Some people suppose that because mining labor is cheap in Mexico, the mines ought to be worked there at greater profit than here. There are, however, many difficulties to overcome. One who has been mining in the United States and is then suddenly transferred to Mexico, having been accustomed to the high wages (and good miners) here, would naturally think that in a country where mining has been active for three centuries, with the low wages of the country it would be an easy matter to make a success of any proposition which the proportionate reduction of wages would, on its face, show an estimated profit.

We had a conversation this week with a gentleman of considerable experience in the country, who has had also several years experience in Mexico. He informs us that he has been forced to this conclusion that cheap labor in Mexico, in nine cases out of ten, is a fallacy. He gave us his reason for this opinion, and as his observations are of general interest, we repeat them:

The average Mexican miner is a creature of custom: so long as he is permitted to carry on his underground work after the manner of his remote prototype, just so long can a high cost of production be counted on.

The principal obstacle to cheap production in Mexico is the tenacity with which the miners adhere to the ancient customs; to break down these barriers of custom is anything but an easy task. Custom is usually as marked in Mexico to-day as it ever was. Just here it may be said that a trip over the Mexican Central railroad does not give one the remotest idea of the actual state of—call it civilization—in Mexico.

The wage earner of to-day is as much a peon as he ever was, and is treated as such. Everything movable about the works is under lock and key, or else the eyes of a guard; coming off the shift the men are systematically searched—dire is the penalty for stealing.

The natural method in handling peon labor (in using the term peon here we refer to that labor under the Spanish regime) was by task work. It is the inheritance of this ancient system that has to-day to be contended with. The labor was all divided, a certain set of men always doing certain work. When the miner drilled the holes, these would be blasted by bosses—for under the Spanish regime peons were not permitted to be the custodians of explosives. After blasting other parties would come in and clean up the waste, etc.

The number of holes to be put in for a shift's work would be governed by the time necessary to remove the waste. This would soon be arrived at for a given district; the cleaning out of the waste would take some little time for it is all packed out on the backs of men. They carry it in raw-hide sacks; a maximum load will be about 200 pounds.

To-day there are districts where two holes—each about half a vara (17 inches) deep constitute a shift's work. These put in and blasted the miner is free to leave; then the peons will come in and clean up.

Where the rock is short so that a blast will not throw down much ground the number of holes will generally be increased. Of course the drilling quality of the ground will be a factor in the matter. Under these conditions working on "day's pay" is out of the question, and the resort must be contract work. Letting the work on contract is only the first step in the right direction. In rock where you would expect the men to advance from 18 to 21 feet per week, the end of the week comes and you find that your breast has only advanced from six to eight feet; investigation will generally show the cause to be poor powder and an adherence to custom in putting in the drill holes.

The black powder of Mexico (*polvora corriente*) compares with black powder such as we are used to in the United States about as our black powder compares with nitro-glycerine powders. This is the key to the 17-inch holes; a deeper hole would be most apt to blow out.

Nitro-glycerine and imported black powders are gradually coming into use; but they are at present expensive.

The old method of putting in holes for blasting was "churning." Two miners would take,

between them, a long iron bar, some two inches in diameter. This would be tipped with steel. They would throw the bar at the point where the hole was desired, after the manner of a hattering ram. This would be kept up until the hole had gained the desired depth. It will readily be seen that this method of putting in holes necessitated the use of long drills. They would be, of necessity, at least three feet longer than the hole. Being long and heavy, it was impossible to give the holes much of a rake.

With powder of little force and holes which were practically straight, the result was a system of plugging; a pot hole would be blasted out in the center of the breast, and this would be enlarged by plug holes until the work was of the required dimensions. The miners of the present day, except where they have been taught better, follow the old method of plugging; hence the slow advance. As a class the miners are hard workers, and the results are not commensurate with the amount of force they expend. Before one can successfully institute reforms, looking to an advancement of the knowledge of the miner, and its consequent financial benefit to the employer, he must thoroughly convince the men with whom he has to deal that he is a master in the art. They will respect power, and in this case knowledge is power. By experience it has been found by our informant that the quickest and most reliable way of bringing about desired changes is to interest the foreman and bosses by talking over the subject and getting them to understand thoroughly how you wish to do a certain thing, and what result you expect.

Having a foreman with ambition (this is the rarest article in Mexico to-day) he will soon begin trying a few little experiments on his own hook. His success will give him confidence. The miners under him will gradually fall in with the new order of things and in a short while the result will be very apparent in the pay roll. Our informant calls to mind an instance where after six months work the pay roll showed that the cost of labor had been reduced on certain work from \$21 to \$10 per meter, the miners earning the same wages (50 cents) per shift. The company was simply getting the benefit of the knowledge that the men had acquired through which they, the men, got an adequate return for the labor expended. The secret was in getting the men to use Giant powder, putting in as deep holes as possible, and, last, but not least, getting the men to put in their holes giving them the necessary "rake" so as to throw down as much ground as possible.

The question will naturally be asked, How do Mexican companies make mining pay? This can be answered in a general way by stating that, as a rule, Mexican companies are not so heavily capitalized as foreign companies. Again, the investment for "plant," with few exceptions, is but a trifle in Mexico as compared with similar investments in the United States; but our informant is convinced that any mine which can show a profit under Mexican management would have this profit greatly increased were the mine manned by a crew of skilled miners.

In metallurgy we can probably take some lessons from the Mexicans, as their knowledge of ores and their treatment is wonderful.

Mining Accidents.

A miner in the Lane mine, at Angels, Calaveras county, was caved on last week and received severe injuries about the head.

A mining accident occurred last week at a mine near Sumersville, Tuolumne county. Two brothers, John and James Quick, were working in the New Albany mine, belonging to John Walker, when they were caved on by a mass of loose rocks. John Quick was almost instantly killed and James badly, but not dangerously, hurt. The dead man had been a mine foreman for several years, and had long been a resident of the county.

A snow slide at Poverty Gulch, near Crested Butte, Colorado, killed three miners named Wm. Alexander, John St. John and Wm. Goss. A recent snowslide killed Robert Corey and Henry Collins.

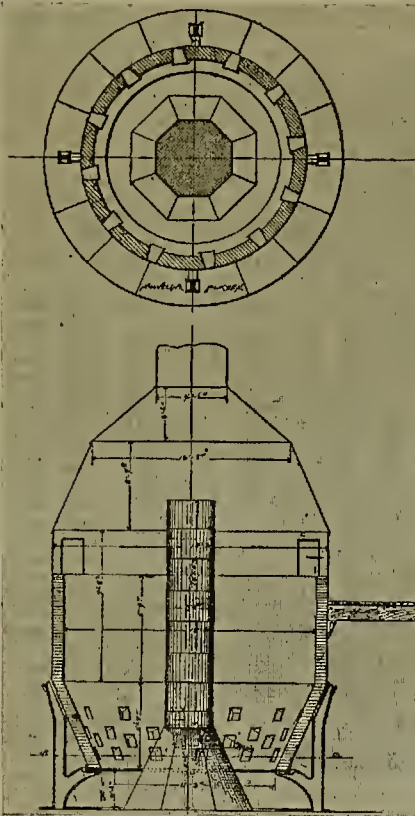
At Eureka, Nev., on Sunday last, Anthony Copeland, a tributer in the Jackson mine, was discovered at noon hurried beneath an immense cave that occurred the previous morning about 10 o'clock in the drift on the 50 foot level, where he had been working for some time past. Inasmuch as he was missed in the morning by his friends, a search was instituted, that resulted in the discovery of the cave. When found only the head and neck of the unfortunate man remained unburied, and he was not only in an exhausted condition, but unable to move, so tightly was he wedged in. Beef tea was administered, when his strength rallied, and the work of cribbing overhead, to prevent a further falling of the earth, was commenced. This was found necessary, owing to the character of the earth and the dimensions of the cave. After being buried for fifty-two hours, Cope-

land was extricated, but died a few hours after, having received fatal internal injuries.

The body of Jas. Oxnam has been recovered from the Germania mine, Montana, after being under water two weeks. In working in a drift he and a fellow miner tapped a large body of water in an adjoining mine. They had put in a shot, and were on the ladder 25 or 30 feet above the bottom of the shaft waiting for the shot to go off, when they heard the roaring of the water above. They didn't know at first what it meant, but soon the water came pouring down the shaft. Oxnam descended the ladder four or five feet, and leaving it, got into the bucket, which was swinging in the shaft. Anderson remained on the ladder. In a moment or two Oxnam was knocked out off the bucket by the force of the water and fell to the bottom of the shaft. A second afterwards Anderson was struck off the ladder and followed Oxnam to the bottom. He immediately grasped the ladder, and being aided by the rising waters he managed to reach the 150 foot drift, where he was rescued by another miner, but Oxnam was drowned.

Alaska Mining Notes.

The great success attending the milling of the low-grade ore of the big mine on Douglas Island,



AMERICAN FORM OF GJERS ORE ROASTING KILN.

Alaska, is attracting more attention to Alaska mines. The Douglas Island mine is shipping gold bullion regularly, \$74,000 having been sent down this month. The mill has 120 stamps with a full outfit of concentrating machinery, and the ore is being worked at small expense. The mill is run by water power, a Pelton and a Knight hurdy gurdy wheel being used. The ledge from which the ore is obtained is a very wide one, and is in fact a great mass of quartz. The ore is of low grade, however, but there is so much of it that the whole thing is a paying proposition.

It is stated that capitalists are now negotiating to put up another big mill on the Bear's Nest mine, which adjoins the Treadwell mine on the north.

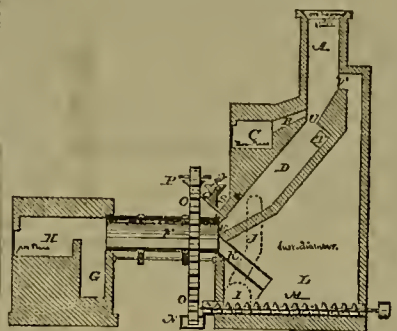
News from the Juneau mines, on the mainland, is to the effect that they have had severe weather of late. These mines are mainly worked in the summer.

From October 1, 1884, to December 1, 1885, a period of fourteen months, the Queen of the Hills at Bellevue, Idaho, made the following output: Total ore and concentrates shipped, sold, 7,273,099 pounds, aggregating 3,639½ tons. The gross value of these ores aggregated \$461,078.98. Out of this amount the company has paid transportation and freight charges aggregating \$134,540.63. This left them net receipts of \$329,538.35.

An Oxidizing and Chloridizing Furnace.

The oxidizing and chloridizing furnaces of John R. Brett, of Oakland, illustrated on this page, presents several new features, and combines a number of important elements in furnace construction. The apparatus is designed for the continuous operation of oxidizing, desulphurizing and chloridizing ores.

It consists of a vertical flue or stack, A, into



Chloridizing and Desulphurizing Furnace.

which the ore in a pulverized condition is fed by any suitable means, and falls downward through the heat and flume, which enter the stack through a passage, B, from the fire-place,

the chamber, L, transverse partitions may be fixed therein, having an open passage around their alternate ends, through which the dust must travel from side to side, as it passes toward the rear of the chamber.

R is a hopper with a passage, S, leading from it into the flue, D, close to the discharge passage, E, and the ore is supplied with salt or chlorine at this point, so that the two enter the cylinder together and are thoroughly mixed by its rotation.

In order to save fine dust from the upper part of the stack, a passage, T, opens from it into the upper part of the dust-chamber, which extends up nearly to the top of the stack at each side. The lower end of the vertical portion of the stack is narrowed at U, in the same manner as the inclined portion is narrowed at its discharge E. The dust-chamber, which may extend up on both sides of the stack, A, has an opening, V, from its upper end into the stack, and as the passages, K and T, are open, while the stack is narrowed and obstructed at E and U, it will be manifest that the draft through the cylinder from the fire, H, will pass through the passage, K, and carry the dust from this part of the apparatus into the dust-chamber, while the draft from the fire at I enters the inclined portion, D, and escapes through the opening, T, carrying the dust from this portion of the apparatus. The dust will settle to the bottom of the chamber, and the heated air and gases of combustion will pass back into the stack through the opening, V, and thus keep up a sufficient draft.

The main features of the furnace are as follows: The self-discharging dust-chamber and automatic return to this cylinder when not sufficiently chloridized. A saving of a large percentage of salt. Saving in weight of cylinder, which is short, as the greater part of the sulphur is eliminated in the stack. There is less volatilization by desulphurizing without salt. A higher percentage of chlorination can be obtained by first desulphurizing, as shown in the report of the Navajo mine, at Tuscarora, Nev. The separate fires give opportunity for perfect control of heat, making it easy to roast the most rebellious ores. By the constant motion of the pulp while being desulphurized there is no danger of matting. The combination of flues and dust chamber makes the construction comparatively cheap, particularly when the mill is placed against steep banks, as only a portion of the upper end of this stack need be made of brick.

Ore Roaster.

We gave last week a brief description of a form of ore roaster, such as is in use at the Colebrook furnaces, Lebanon, Pa. Another American modification of the Gjers kiln is in use at the Norway furnace, Bechtelsville, Pa., and was described before the American Institute of Mining Engineers, by John Birkinbine, of Philadelphia. The engravings herewith show vertical and horizontal sections of the furnace built at Norway. The casing of each roaster is supported by four main brackets or legs, on which the bottom ring-plates and bosh rest. A lining of red brick laid in clay is placed within the casing up to a level with the charging doors, of which there are six. This lining has walled into it a series of poke-holes made with cast-iron frames. The roaster is lined with a hood of wrought iron, and also has a wrought-iron draught stack. A solid base of masonry, octagonal in plan and conical in shape, covered with cast-iron plates, supports a boiler-iron cylinder three feet in diameter, which is placed in the kiln with a view of securing a greater regularity in heating the ore and less liability of clinkering. The bottom ring-plate, to which the shell is riveted, and which sustains the lining, is supported by the lower arm of the four main brackets, and also by tension-rods carried by stirrups on the upper arm of the brackets.

The castings required for the roaster are the main brackets, cone-plates, poke hole frames, bottom ring, small brackets, washers, etc., and aggregate in weight for one roaster about 15,000 pounds. The shoveling plates of one roaster weigh about 6000 pounds. The boiler-iron for shell, cone and draught-stack for one roaster weigh about 16,000 pounds, and the central cylinder adds to this about 1800 pounds. In addition to the above, there will be required for each roaster 700 pounds of bolts, 11,000 red bricks, 1½ tons clay, 10 cubic yards of masonry, and necessary excavation and grading.

The view of these roasters is given as one of the later constructions of this particular type. They are often constructed without any hood or cover above the charging level. Most of them heretofore built have had the bottom ring sustained upon a series of short cast-iron columns. The central cylinder also is not in general use, the bottom cone being ordinarily continued to an apex, and sometimes made to inclose air-flues.

C. From the foot of the vertical flue, an inclined flue, D, extends downward, at a sufficient angle to insure the flow of the ore down to the discharge opening E, which is narrowed, so as to only allow the ore to flow through, the space not being large enough for a current or draft, which would carry off the dust. The cylinder, F, is supported in the usual way upon wheels or rollers, so as to be rotated by suitable machinery, and it stands at a slight angle with a horizontal line, so that as it rotates the ore moves slowly through it and discharges from the end farthest from the inclined flue into a chamber or pit, G. The fireplace, H, at the same end, communicates with the cylinder, and supplies the requisite heat to assist in chloridizing. A fireplace, I, connects by a flue, J, with the lower part of the inclined flue, D, to supply heat at that point. From the end of the cylinder nearest to the flue, D, an inclined passage, K, leads downward into the dust-chamber, L, the bottom of which inclines sharply to a spout or trough, within which a screw conveyor, M, revolves, and carries the dust into a receptacle, N, from which it is lifted by a bucket or other elevator, O, and discharged into a hopper, P. A pipe or passage, Q, reconveys the dust from this hopper, P, into the lower end of the flue, D, in case it has not been completely chloridized. If it is desired to settle the dust more completely within

PRACTICAL HYDRAULICS.

NUMBER 15. COPYRIGHTED.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

TABLE 17.

Velocities and Quantities of Flow in Clean Iron Pipes, due to given Slopes and Diameters.

Fall per Mile. Feet.	Sine of Slope. $s = \frac{h}{l}$	DIAMETERS.							
		3"= .25 feet.		4"= .333 ft.		6"= .5 feet.		8"= .667 Feet.	
		Velocity Ft. per Sec.	Cubic Ft. per Sec.	Velocity Ft. per Sec.	Cubic Ft. per Sec.	Velocity Ft. per Sec.	Cubic Ft. per Sec.	Velocity Ft. per Sec.	Cubic Ft. per Sec.
8.448	.0016	.....	.....	.....	.....	.....	.....	1.64	.573
8.976	.0017	.....	.....	.....	.....	.....	.....	1.68	.586
9.504	.0018	.....	.....	.....	.....	1.44	.282	1.75	.611
10.032	.0019	.....	.....	.....	.....	1.48	.290	1.80	.628
10.560	.0020	.....	.....	1.25	.1091	1.52	.298	1.83	.639
11.116	.0022	.....	.....	1.31	.1144	1.60	.314	1.93	.659
12.672	.0024	1.10	.0540	1.36	.1187	1.68	.330	2.02	.703
13.728	.0026	1.16	.0569	1.42	.1235	1.76	.346	2.11	.737
14.784	.0028	1.22	.0599	1.48	.1298	1.83	.359	2.22	.768
15.840	.0030	1.28	.0630	1.53	.1335	1.92	.377	2.32	.808
18.480	.0035	1.41	.0692	1.68	.1465	2.10	.395	2.51	.876
21.120	.004	1.53	.0749	1.79	.1562	2.26	.444	2.69	.931
26.40	.005	1.71	.0839	2.03	.1771	2.53	.496	2.99	1.015
31.68	.006	1.86	.0915	2.20	.1923	2.79	.548	3.32	1.157
26.96	.037	2.02	.0992	2.46	.2146	2.79	.589	3.32	1.262
42.24	.008	2.16	.1060	2.67	.2339	3.00	.631	3.62	1.344
47.52	.009	2.28	.1119	2.82	.2460	3.22	.672	3.85	1.424
52.80	.010	2.43	.1190	2.96	.2582	3.43	.721	4.08	1.496
63.36	.012	2.68	.1313	3.23	.2893	3.67	.784	4.29	1.614
73.92	.014	2.88	.1413	3.48	.3036	3.99	.858	4.71	1.782
84.48	.016	3.07	.1507	3.71	.3237	4.37	.922	5.11	1.916
94.04	.018	3.24	.1590	3.91	.3412	4.70	.975	5.49	2.033
105.6	.02	3.50	.1717	4.13	.3607	4.97	1.022	5.83	2.155
158.4	.03	4.24	.2081	5.16	.4502	5.21	1.263	6.18	2.667
211.2	.04	5.03	.2469	6.11	.5331	6.43	1.484	7.64	3.145
264.0	.05	5.67	.2785	6.83	.5954	7.56	1.665	9.01	3.513
316.8	.06	6.21	.3049	7.32	.6390	8.48	1.929	10.06	3.847
369.0	.07	6.79	.3231	7.99	.6967	9.83	1.976	11.02	4.196
422.0	.08	7.25	.3559	8.60	.7506	10.06	2.114	12.02	.....
475.2	.09	7.78	.3816	9.13	.7960	10.92	2.274	.....	.....
528.0	.10	8.24	.4043	9.70	.8467	11.58	2.399	.....	.....
633.6	.12	9.05	.4440	10.63	.9270	12.21	.....	.....	.....
739.2	.14	9.77	.4977	11.53	1.006	.....	.....	.....	.....
844.8	.16	10.46	.5131	12.38	1.081	.....	.....	.....	.....
950.4	.18	11.08	.5436	.....	.....	.....	.....	.....	.....
1056.	.20	11.88	.5832	.....	.....	.....	.....	.....	.....
1320.	.25	13.29	.6523	.....	.....	.....	.....	.....	.....

SAN DIEGO MINES.—A correspondent of the *Los Angeles Herald*, writing from the Julian mining district to San Diego county, says: "The present appearance of this camp indicates a prosperous future. The Owens resumed work on the 4th inst., the superintendent having returned from his trip to San Francisco, where he went to contract for the new quartz mill for the Owens mine, which will have power to run fifteen stamps. The lower level presents a fine body of ore—unequaled by any mine in the State, the face in the tunnel being fully five feet where the glittering metal is plainly discernible. The hoisting works are in splendid condition, and everything in connection with the mine runs gaily. An additional force will soon be put in the stope, and when the mill is erected I have no hesitancy in saying that the first run of quartz from the Owens will be the biggest gold run ever taken out in this district. The San Diego will soon resume work with a new suit, having abandoned the old tunnel. A new one has been sunk, and the precious stuff plainly in sight. No stopping of consequence has been done in this mine, so the mine remains undisturbed."

ENFORCED INDUSTRY.—It was a good old law, no doubt, that as enacted by the General Court of the Massachusetts Bay Colony, in 1655, obliging our ancestors of that time to spin wool, cotton, flax, etc., into yarn for clothing, under a heavy penalty if not complied with. Unemployed women and children were enjoined to spin according to their skill and ability, and the selectmen of every town were ordered to assess every family within their respective jurisdiction with a certain production of yarn per year, at the rate of ninety pounds for a full spinner's work. If such laws were in force now there would be fewer paupers in the country. Bringing up children in idleness is one of the most fearful sources of suffering and crime.

TWELVE HUNDRED TRAINS IN ONE DAY.—On a recent public day in New York, 12,000 trains passed through the Grand Central depot in that city. Trains came and went as fast as they could be handled. The immense transportation work which is done by railroads on special occasions, is made possible by the "block signal" and "interlocking switch" systems. Without such aid, railways would be unable to do anything like the immense business, which of late years is so often thrust upon them. It is only by considering such figures as the above that we can form any adequate idea of the immense advantages and conveniences conferred upon the public by the present improved system of this modern mode of travel.

SALE OF THE PINACATE COAL MINE.—The coal mine at Pinacate has just been sold to Eastern parties for \$150,000. A seven-foot vein was recently discovered, and, on a test being made by experts, the coal was found to be entirely suitable for smelting purposes. On the strength of this test the sale was made. It is supposed that the Atchison Railroad is the real purchaser. This is news of considerable importance, and its accuracy may be relied upon. It adds another and very important one to the list of our country's valuable resources. This mine is near the line of the California Southern, 100 miles from San Diego.—*San Diego Union*.

The strike in the Mayflower mine was the event of Placer county in 1885. When the pay gravel was first reached about the first of July, 600 ounces were taken out the first week, and the report of October 1st to the stockholders showed that exactly 124,000 had been taken out after a ninety days run. The yield has been as constant and steady since then, having been interrupted only a few days by a breakage of machinery. It is fair to assume that about sixty per cent of the yield is net profit. The Mayflower was a hydraulic mine from 1877 to 1883, during which time it turned out about \$25,000; owing to litigation and the high price of water it did not pay.

A USEFUL PUBLICATION.—The venerable Professor Vilanova is about to publish a polyglot dictionary of scientific and technical terms. He will himself prepare only the Spanish and French part of the work, but he expects others will take up and supplement his work, until a cyclopedia of the sciences is produced in which any man can readily find exact statements of the facts in his own language, and their equivalent in all other languages. It is an important work, and the congress and all geologists will doubtless help him to the extent of their power. He secured the endorsement of the work by the International Geological Congress at its last session.

THE DERRIS APPEAL.—In the case of Edward Woodruff vs. the North Bloomfield Mining Company, et al., involving a settlement of the debris question, which has been decided in the Circuit Court in favor of the plaintiff, Judge Sawyer has granted a motion of appeal to the United States Supreme Court, on condition that the defendants should file a bond in the sum of \$500 to pay all costs. The case is an important one, inasmuch as it settles the mining debris dispute. Judgment was given the plaintiff in the Circuit Court, allowing him an injunction and preventing the defendants from hydraulic mining.

USEFUL INFORMATION.

An Enormous Granite Slab.

Probably the largest piece of granite that was ever split by mechanical means, from its position in a quarry, was recently separated from the main ledge in the Flynt granite quarry, in Mounson, Mass. The piece or slab was 354 feet long, 11 feet wide, and from 3 to 4 feet thick. It was separated by the means usually employed in all quarries for separating slabs or blocks from the main ledge. A row of wedges were set, several hundred in number, and the workmen beginning at one end gently and carefully tapped the wedges, moving by degrees down the line until the other end of them was reached, when the same operation was repeated. In this manner, by patient application, the slab of the above phenomenal size was successfully separated from the main rock. The value of this immense slab, if it could have been transferred safely to one of our large cities, at not too great cost, would have been several thousand dollars. And it seemed almost sacrilegious that it was necessary to cut it up into smaller blocks for transportation, and finally used for ordinary building purposes.

In this connection it may be noted that the largest single stone ever shipped by any railroad in this country was recently loaded on a car at the Erie railroad in Jersey City. The stone is for a monument in Buffalo, is 14 feet in diameter, weighs 15 tons, and cost \$5000. The car was prepared especially for the stone; two of the center sills were cut off and braced, and this stone swung down through the floor. The height of the stone when loaded was 15 feet from the track.

AN INGENIOUS NUT CRACKING MACHINE has recently been constructed at St. Louis, intended for cracking pecan nuts, or rather so preparing them that the shells can be readily and rapidly removed by hand, leaving the kernels unbroken. The machine is provided with a hopper into which the nuts are poured and is driven by power. At the bottom of the hopper is a small nut-shaped space, which is opened for or closed against the nuts automatically by a slide. This space is just large enough to admit the nuts singly on end, and centering on it are six knives arranged at equal distances from each other, and so designed that each of them cuts the shell of the nut longitudinally its full length. The knives are held clear of the cutting point by strong springs until the nut has dropped in place, when they are driven forward simultaneously upon it, against the pressure of the springs, by cams on a revolving plate. When the nut is cut it drops through. Girls husk the nuts without trouble after they have passed through the machine; and the kernels are shipped all over the country to be used in the making of candy and for various other purposes. The machine is operated by a company at Austin, Texas, which does an immense business.

A DEAD BLACK PAINT.—The *Locomotive*, issued monthly by the Hartford Steam Boiler and Inspection Company, gives the following receipt for painting brass tubes, and such articles as optical instrument makers produce, a "dead black." The writer says he has found all the formulae and recipes given in the books unsatisfactory because of their vagueness, but that the following can be relied upon to give a first-rate dead black, and it is easily made: Take two grains of lampblack, put it into any smooth, shallow dish, such as a saucer or small butter plate, add a little gold size, and thoroughly mix the two together. Just enough gold size should be used to hold the lampblack together. About three drops of such size as may be had by dipping the point of a lead pencil about half an inch into the gold size, will be found right for the above quantity of lampblack; it should be added a drop at a time, however. After the lampblack and size are thoroughly mixed and worked, add twenty-four drops of turpentine, and again mix and work. It is then ready for use. Apply it thin with a camel's hair brush; and when it is thoroughly dry, the articles will have as fine a dead black as they did when they came from the optician's hands.

PAPER SLIPPERS are the latest form in which paper is introduced. Mr. W. Litchfield, of New Broad Street, London, has patented a system of manufacturing slippers, sandals and other coverings for the feet, out of paper. In carrying out this invention, paper, paper pulp, or papier-mache is employed for the upper, which is molded to the desired form and size, and a sole is provided made of paper or pasteboard, leather-board, or other suitable paper material, which is united to the upper by means of cement, glue, or other adhesive material. The upper is preferably creased, embossed or perforated at the instep and sides, or other parts thereof, so as to prevent the breaking or tearing of the same while in use. The sole may be made with or without a heel, and, if so desired, the slipper, or other foot covering, may be provided with an internal lining of any suitable material.

PREPARING BEESWAX.—In an article on preparing beeswax for market, an English writer says that the great secret of having a neat looking product, lies chiefly in the melting of it. He states that direct heat must not be em-

ployed, but that a water bath must be used, into which the vessel containing the wax must be placed. To clear the melted wax and throw down the little particles of dross that may be present, he adds one drop of sulphuric acid to every 15 pounds of wax.

COLORING MARBLE.—By means of a simple chemical process a beautiful coloring of yellow is now given to marble, without any injurious effect upon the polish or hardness of the stone. Neutral chloride of iron is for this purpose dissolved in 90 per cent of alcohol, and after gently heating the marble to be colored, the solution in question is applied by means of a brush, a sprinkler, or by pouring, the strength of the solution being, of course, proportioned to the depth of the color desired, and care being requisite also in regard to the degree of temperature. On the marble becoming completely dry it is moistened with water or exposed to moist air, when the decomposition of the salt of iron takes place in the upper stratum, and the process of coloration is complete, all that remains to be done being to polish the surface, if necessary, or it may be simply rubbed off with a wet cloth. For light tints very diluted solutions are applied.

KEEPING APPLES.—Mr. S. W. Jewett, writing from Vermont, tells of a method by which he preserved apples fresh and fair for 18 to 20 months. "The system is," Mr. Jewett proceeds, "to take the apples ripe and fresh from the trees at this season of the year and cover them up with dry, fine coalashes, to a depth of 14 to 18 inches. I have apples that have passed two winters thus preserved out of doors, exposed to rain and frost, and yet the fruit came out fresh and fair. How much longer the apples would keep under these circumstances I do not know. Possibly pears, eggs, and some other perishable articles might be kept by this simple and inexpensive process much longer than under present methods. There is no patent on this suggestion, and its simplicity and light cost should induce the experimenting of those who desire to keep fruits for long periods."

A NEW POTATO.—According to the *American Naturalist* we are to have a new kind of potato that will not rot. It is to be a hybrid formed between the common Irish potato and a similar tuber found in the southernmost parts of South America. Next to a roll of fresh dairy butter that has never flirited with the oleaginous portions of the festive porker, the potato that has no decay lurking in its system will occupy the front door of the American household.

A "RED LETTER DAY" means a lucky or auspicious day. The expression was derived from the custom of printing the names of saints' days and holy days in red letters. "Black letter days" signified unlucky days. The Romans marked their lucky days with chalk and the unlucky ones with charcoal.

GOOD HEALTH.

The Cause of and How to Delay Old Age.

A Scientific Discussion of the Question.

The principal characteristics of old age, as demonstrated by anatomical research, are a deposition of fibrinous, gelatinous and earthy material in the system. Every organ of the body, during old age, is especially prone to ossific deposits. The earthy deposits have been found to consist primarily of phosphates and carbonates of lime combined with other calcareous salts.

According to the researches of Dr. Williams, of England, man begins in a gelatinous and ends in an osseous or bony condition. From the cradle to the grave a gradual process of ossification is undoubtedly present, but after passing middle age the ossific tendency becomes more markedly developed, until it finally ushers in senile decrepitude. These earthy deposits during old age materially interfere with the due performance of function by the organs, hence we find imperfect circulation in the aged; the heart gradually becomes ossified, the large blood vessels blocked up with calcareous matter, and nutrition hindered.

A distinguished physiologist says: "If repair was always equal to waste, life would only terminate by accident." And it is the opinion of eminent scientists that the majority of all who pass sixty-five years suffer more or less from these ossific deposits. Therefore, bearing these facts in mind, we plainly see that the real change which produces old age is nothing more or less than a slow but steady accumulation of calcareous matter throughout the system. The idea that old age is brought about simply, or at all, by a decline of the vital principle has long since been discarded by scientists, and the true cause found to be that of gradual disintegration of the tissues because of the inadequate supply of blood. Following out the ideas of Dr. Williams, this process is believed to be of a chemical nature, and the causes being nothing more or less than ossific deposits, let us for a moment look for the causes and influences leading to the condition we have described.

The Two Principal Causes of Old Age

Are, first, fibrinous and gelatinous exudates; and second, calcareous deposits. According to recent researches of Delany Evans, the origin of

the first, may undoubtedly be traced to the destruction of atmospheric oxygen, and demonstrable by the following argument:

In the air we breathe the relative proportion of oxygen to nitrogen is 22 to 78; and although oxygen is in far smaller bulk, yet it is the most active element. Now, oxygen has an affinity for every other element except fluorine; and as oxygen plays by far the most important part in these chemical changes constantly at work in the economy, life itself is but a constant waste by oxidation and reparation by food. In the blood exists albumen and fibrin, themselves resolved into component parts, carbon, hydrogen, nitrogen, oxygen, sulphur and phosphorus. Fibrin, it is claimed, contains one end five tenths more oxygen than albumen. Now, oxygen converts albumen into fibrin, fibrin itself being out an oxide of albumen. Although unquestionably fibrin nourishes the organs of our body, yet it becomes at times, as we reach the cool and shady walks in the evening of life, accumulated in redundant quantity, blocking the streams of life as doth the chilling winds of winter the mountain rivulets. There is always a struggle going on in our bodies between accumulation and elimination, and thus it is that the fibrinous and gelatinous accumulations of old age are chiefly traceable to chemical action of atmospheric oxygen.

The calcareous deposits next claim our attention, being proved by anatomical investigation to be peculiarly characteristic of old age. In the human body water forms 70 per cent of its aggregate weight; in fact, there is not a single tissue but contains water as a necessary ingredient. Now, water holds certain salts in solution, which become more or less deposited, notwithstanding the large proportion eliminated through the secretions, and it is but a question of time before these minute particles deposited by the blood have a marked effect in causing the stiffness and aridity of advanced life. The reason why in early life the deposit of earthy matter or salts is so infinitesimal is simply because they have not had time to accumulate. Besides providing the requisite elements of nutrition, food contains calcareous salts, which being deposited in the arteries, veins and capillaries, become the proximate cause of ossification and old age.

How to Retard These Changes.

Having now traced the primary existence of calcareous matter to food itself, it is consequently a subject of no small moment to ascertain the various dietetic articles containing these salts. As a matter of fact, everything we eat does contain them to a greater or less degree. The cereals are found most rich in them; so bread itself, the so called staff of life, except in great moderation, most assuredly favors the deposition of these salts in the system. The more nitrogenous our food, the greater its percentage of calcareous matter; hence a diet composed principally of fruit, from its lack of nitrogen, is best adapted for preventing or enfeebling ossification.

Moderation in eating must ever be of great value as an agent for retarding the advent of senile decay. Large eaters more rapidly bring on ossific deposits by taking in more than is utilized or excreted, naturally resulting in blocking the vessels and destroying their normal functions. According to the best authority I have been able to consult, the following seem to be the best articles of food; as containing the least earthy salts: Fruit, fish, poultry, flesh of young mutton and beef, because, as before stated, of their being less nitrogenous. Fluids, as part of the diet, are of special import. All well and spring water contains considerable of the earthy salts, and should therefore be avoided, and cistern water used in its stead, because water is the most universal solvent known. Therefore, if, when taken into the system clear of foreign matter, it is to that extent the better prepared to dissolve and take up those earthy salts, and convey them out of the system. The addition of 15 or 20 drops of dilute phosphoric acid to the glass of water, and drank three times a day, will add to the solubility of these earthy salts.

WAR ON THE SKATING RINKS.—Our exchanges speak of a general collapse of the public skating rinks throughout the country. Lately the pulpit, Protestant and Catholic, has been making war on the rinks, where young people of both sexes are thrown promiscuously together at uneconomical hours, without proper guardianship, and form improper acquaintances which often turn out badly. The medical profession opposes the public rink also, where the exercise becomes, when long-continued, injurious to health and limb.

STEAM BATHS FOR DIPHTHERIA.—Dr. Wachs-smuth, of Berlin, recommends the Russian steam bath for diphtheria. The patient at first takes as much warm tea or thinned milk as he can drink. The legs are then put for a long time in hot water, and afterwards rubbed vigorously with the hand. The treatment is varied according to the stage of the disease by hot and cold rubbings and warm drinks. The patient is finally wrapped in woolens, and will recover if he can be made to sweat.

THE TELEPHONE AND CONTAGIOUS DISEASES.—An English company has perfected its arrangements for providing sick chambers with telephones. The object is to give persons suffering from contagious diseases a chance to talk with their friends. Speaking tubes are inadmissible on account of the infectious nature of the breath.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CLEANUP.—Amador Ledger, Jan. 23: The last clean-up at the Gover, made early in the month, was of a very satisfactory character, although we are not able to give the exact yield per ton. The ore-body is said to be over 20 feet wide, and improving in quality. Everything points to the return of the dividend-paying era for this property at no distant day. Captain Theis, a mining expert, is in Amador City, having been sent out from the East in the interest of the stockholders of the Bunker Hill Mining Company. We understand he is highly pleased with the appearance of the mine, and everything pertaining to its management. The mine has a brighter outlook to-day than it has had for years. Mine and mill give employment to about 70 men. At the South Spring Hill matters have quieted down to the regular routine work of mining. The 20-stamp mill is working finely in every part; it is conceded to be as perfect a mill of its size as there is in the State. An air-compressor for underground drilling has been ordered, and is expected up daily. Messrs. Clements & Co. are also fixing up their contrivance for saving the gold-bearing slime from the tailings, believing that it will pay with 20 stamps, although it was unremunerative with a 10-stamp mill. We paid a visit to the Kennedy last Saturday to see the new water-power hoisting machinery in motion. They have now got down to the steady work of baling out water, the machinery being in perfect running order. The shaft is being drained by means of two huge iron buckets, holding 500 gallons each, the empty bucket descending as the full one ascends. These buckets are mounted on flanged wheels which run on iron tracks. When the bucket reaches the surface, the whole frame-work upon which it is suspended is pushed out from the bottom, which carries the bucket clear of the shaft; it is then lowered, the weight of the bucket pressing up a false bottom, and letting out the water. It is one of the simplest and most effective methods of taking out water that we have seen, and reflects credit upon its constructors, Messrs Knight & Co. Water is raised at the rate of about 20,000 gallons per hour. During the first two or three days' work the water level was reduced 45 feet, which gives birth to the hope that the drainage of the mine is not so formidable a task as was anticipated, and that the bottom will be reached in about two months.

Calaveras.

MURPHYS.—Calaveras Citizen, Jan. 21: The starting up of the Ore Plata mill, stamps and pulverizers, on the 1st of the present month marks the era of a new departure in crushing ores, as the Tustin pulverizers arranged for wet crushing have proven to be an entire success. Those who have had the opportunity of witnessing their splendid working are enthusiastic in their praise. The advantages claimed over stamp batteries, are, greater crushing capacity, with less power, more thorough work in reduction, and a larger percentage saved of sulphurets, and the precious metals, and decreased expenditures, as the wear and tear is less. It is the opinion of those who are capable of judging that it is only a question of time when they will displace stamps. Mr. Tustin, the inventor, has been here for a week, taking a deep interest in the alterations from dry to wet crushing, and leaves for San Francisco to-day entirely satisfied with the success of the alterations.

El Dorado.

EAGLE KING.—Pacerville Observer, Jan. 22: John Camp, of the Eagle King mine, near Grizzly Flat, informs us that he is arranging to erect a mill on his mine at an early day. His tunnel is in to a distance of 600 feet, and he has struck a new chute of very rich ore, which has been followed for forty feet at a depth of 100 feet from the surface. The ledge is well defined, and continually widens as greater depth is attained. In a few months more Mr. Camp will reap the reward his energy and perseverance so richly merit.

GREENWOOD.—In years gone by considerable mining was done and large sums of money expended. Several mines are now being worked in the immediate vicinity, and in two or three of them work is being systematically and actively prosecuted; especially is this true of The Revenge mine, located one and a half miles southeast of Greenwood. This mine, under the able and efficient superintendency of F. R. J. Dixon, is keeping up its regular lick night and day, and what is better still, is keeping up its regular dividends. Ten men find steady employment, and are working in ore that speaks well for the permanency of the mine.

STRUCK IT RICH.—Record-Union, Jan. 21: A. Flohr, of this city, and a few others have been engaged for about two years in developing the North Star mine, located about a mile from Shingle Springs. The prospects were at times discouraging, and some members of the company dropped out, but Flohr and three or four others held on. Last Saturday they were rewarded for their persistence by "striking it rich." They have come upon a fine vein of rotten rock, full of free gold. Yesterday Mr. Flohr brought a barley sack full of specimens of the rock down from the mine, and those who looked at it were free to confess that if the rock holds out like the specimens, he has the richest mine in California.

Mariposa.

NEW MILL.—Cor. Mariposa Herald Jan. 20: I have just interviewed R. B. Harper, the experienced and successful mining superintendent of the Red Cloud mine, situated in this county, north of the Merced river, and near Coulterville. Mr. Harper has just bought 2 batteries of 6 stamps each, making 12 stamps in the two batteries. He says that he will have them hauled to the mine, and have them put in place as soon as possible. The company has 10 stamps running at present, but when these additional 12 stamps are in running order, they will have 22 stamps. Mr. Harper says that they have a fine mine. The shaft is down 350 feet, and they have a body of quartz. The vein is 4 feet wide and all good milling ore. Mr. Harper says he will sink the shaft 100 feet deeper, which will give him 450 feet, backs all good ore. He has Thomas Marshall in charge of the mill.

Nevada.

BADGER HILL MINE.—Grass Valley Union, Jan. 23: The Badger Hill Mining Company in its reorganization fixed the number of shares at 50,000, and of these 30,000 were set apart as a working fund to be sold at fifty cents per share, to be paid for in three installments. The remaining 20,000 shares are not to be issued to the original stockholders until all of the installments on the 30,000 shares for working capital have been paid in. This will put the company on a good working basis, and insures a capital that will keep the mining going for about one year, during which time sufficient exploration can be done to open up the resources of the mine by sinking the shaft for another level and running more drifts. Already nearly 20,000 shares of the stock for working capital have been subscribed for, mostly by local residents. There will be as little delay as possible in putting up pumping and hoisting works over the shaft, which are to be run by water-power. The Idaho ditch which is now being rapidly constructed, is to convey the water to the top of the ridge above the mine, and from thence the water will be conveyed to the works a distance of 600 feet, by a pipe line. The water will be under a pressure of 57 feet at the works, which will be sufficient to drive a Pelton wheel to do the hoisting and pumping. The cost of water for power will not exceed \$3 per diem, and the whole surface plant can be put up at a very moderate figure. The present shaft on the mine is down between 170 and 180 feet, where the ledge shows from 18 to 20 inches in size. The mine was never systematically worked in the prospecting that has been done, but the ore taken out gave good returns, such as to justify the development that the new company has determined to make.

A MILL TEST OF QUARTZ.—Foothill Tidings, Jan. 21: A few days ago, Dan. Tuttle hauled over from French Corral which is a hydraulic mining locality, a load of quartz from the Slide mine. The load was nearly but not quite two tons. The mill returns from the load was gold valued at \$34 or \$17 per ton. This return was made by valuing the gold at \$17 50 per ounce, but the gold from the ledge is worth \$19 an ounce. The ore crushed was taken from a depth of about 50 feet. The ledge is some 18 to 20 inches thick. The principal owner is Alex. Dahlberg. The mine is to be opened in a systematic way, and it will give the owners all the money they ought to have if the ledge pays even as low as \$10 a ton. The facilities for taking out ore could not be better, and all the water needed for power is right at the mine.

BADGER HILL.—Grass Valley Union, Jan. 21: The company will proceed to work as soon as the season will permit, by the erection of the necessary hoisting and pumping works. Water will be used as the motive power to run the works and a ditch is now being dug to utilize the water from the Idaho pipe line. The old workings of the Badger mine are several hundred feet in depth, and drifts are opened to some extent, and after the mine is free of water it will not take long for it to produce ore. The company will start with a good working capital.

THE EMPIRE COMPANY'S NEW MILL.—The large new mill building of the Empire Company, which has been in process of erection for some time was covered in last week. There will be room for forty stamps, but at present but twenty will be put up, which will give a head of forty stamps, with the twenty now in use. It is understood that the increased milling facilities are provided because of the determination to bring in water power to cheapen the cost of milling and hoisting.

TOO MUCH WATER.—Grass Valley Union, January 26: The heavy rains of the past week interfered with operations of the Horseshoe mine, as the shaft being near the creek the amount of water required to be handled by the pump kept constantly increasing, and on Saturday the pump, an 8-inch, was just able to hold the water at a given point. The heavy rain on Sunday night, however, increased the flow to such an extent that the pump was submerged yesterday forenoon, and all operations were necessarily suspended. The company will now wait until the rainy season is over before resuming work. Since starting up several months ago the work of sinking below the 100-foot level has been going on for the purpose of opening another level, 45 feet having been put down. A good ledge was showing in the shaft.

Placer.

FOREST HILL.—Cor. Placer Argus, Jan. 21: The superintendent of the Washington mine has commenced sinking a winze in one of the tunnels running off from the main shaft, and at a distance of 500 feet from it. It is now about thirty feet down. The contractors of the Baker Divide tunnel finding steam too costly a motive power wherewith to run their air-compressors, intend soon to erect machinery to be driven by water power. They will erect a thirty-foot water-wheel about 425 feet below the mouth of the tunnel, the power to be transmitted by means of cables, each about 200 feet long, with gearing about midway. It will be no easy matter to do this, as the hillside is very steep. The Live Oak mine is giving a good account of itself. The tunnel is now in about 300 feet. One hundred and twenty-two feet below the level of the tunnel the bedrock was struck last Thursday. It pitches very sharply to the east and south. Superintendent Chappell will sink about fifteen feet more and then he will cut into the gravel. The prospects of the company soon obtaining big pay are extremely flattering. About fifteen men are constantly employed in the mine.

Shasta.

PLACER AND QUARTZ.—Shasta Co. Democrat, Jan. 10: The Squaw creek country, despite the cold, stormy weather, is alive with prospecting parties. The mining outlook in French Gulch district is exceptionally bright. Col. Gannon & Co. will add another mill there soon. Tom Green was in town yesterday, and shipped another chunk of bullion, the cleanup of the last run of 13 tons of ore, which averaged a little over \$50 per ton. Twenty men are at work on the Backbone road from Kennett station to the Squaw creek mines. The road is being pushed through in order to get milling machinery in as soon as possible. Robinson has given up his contract to put up milling machinery on the Scheerer mine. Part of the quartz milling machinery for the Croesus Mining Company, on Squaw creek, consisting of a Westinghouse engine and boiler, etc., arrived the latter part of last week, and will be shipped to the mines in a few days. Col. Gannon, who owns an

interest in the Scorpion mine, at French gulch, informs us that a rich strike was recently made in the lower tunnel of that mine, and preparations are being made to immediately place a mill thereon. The mining future in that district is brighter than ever. Yesterday Col. Gannon, of San Francisco, exhibited at this office a specimen of quartz taken from the old Washington ledge at French gulch, in which Judge Bush owns an interest. This mine has yielded nearly a million dollars in gold since its discovery.

ANOTHER BONANZA.—Courier, Jan. 23: Decker and partners have discovered and are opening up what promises to be another tellurium bonanza. The find is situated at or near the mouth of Bulgin Gulch, and the ledge averages 16 feet in width, and is traceable for several hundred feet. A shaft sunk on the ledge 14 feet in depth shows no diminution of the ore body. The few men in this county who know tellurium when they see it, say that the ore will go into such high working figures that they would not like to hazard their tellurium expert reputation on its real worth. A specimen of the ore, 25 pound in weight, can be seen at G. R. Knox's Mineral Exposition.

SQUAW CREEK.—Redding Free Press, Jan. 26: The Squaw creek mining district is just at present attracting the largest share of public attention. Mr. Jack Bean was up through that country last week, and informs us that all the developments made so far look exceedingly well. The Croesus mine, discovered by Whittion & Small, is now owned by four energetic men, namely—Ollie Whittion, George Bassett, Colonel Stocks and Graupner. Ten men are employed in clearing away for a mill site, and the mill and machinery is expected up daily.

NEW TUNNEL.—Mt. Messenger, Jan. 23: The new tunnel on the Good Hope claim is now in about fifty feet. The South Fork tunnel, at Forest City, is now in 150 feet. One set of timbers is put in by each shift of ten hours.

Tuolumne.

LEASED.—Union Democrat, Jan. 20: The Sell mine located on Bald mountain, which was leased a short time by Johnson & Jones for a period of two years, has passed entirely into the control of Mr. Johnson as sole lessee; he has purchased the interest of Jones for the sum of five hundred dollars. The mine is looking well and promises to be paying property.

San Bernardino.

THE NEW GOLD FIELDS.—Cor. Calico Print: The new gold find in ledges in Arrow mining district at the south end of Providence, is creating quite a stir in mining circles since it has become known that the statements published in the Print were not overestimated. The claims which have had any work done on them, are showing up much better than anticipated. In my letter to you two weeks ago, I stated that some ore was being shipped to Kingman sampling works. I have seen the returns and will give them to you exactly. The Mexicans shipped nine and a half tons, the assay results being five ounces in gold and five and one-third ounces in silver. A company of miners shipped two lots of ores as a working test from the Golden Queen, giving returns of five and three-tenths ounces of gold and eleven ounces of silver in one instance and the other four and three-tenths ounces in gold and five and eight-tenths ounces in silver per ton. These figures speak for themselves. The main ledge of the camp which now has 11 locations on it and on which little or no work has been done is now being prospected by one of the owners on the Red Cloud claim. There has been a body of ore struck which shows in sight from 500 to 1000 tons of ore. So far the assays range from \$40 to \$100; none of the ore assaying less than \$40. The main ledge is well defined and although not much of an expert myself, I could walk on the croppings of the ledge for the whole length of the 11 claims. There are a number of smaller veins being prospected by old miners, which are opening up well. A new wagon road is being laid out from Fenner station on the A. & P. R. R. direct to the mines. It is supposed to be only 20 miles from that place to the district.

THE MESCAL MINE.—The Cambria mine of Mescal about 35 miles north of here has been bonded by Los Angeles parties from McFarlane & Barrett, for 100 days. I did not ascertain the amount of bond. The parties bonding start up the works on the 1st of February. The mine is said to be richer as it goes down.

NEEDLE NOTES.—Cor. Calico Print, Jan. 22: Since my last communication there has been quite a stir among the denizens of our quiet burgh, all about some old locations near Goff's station, 23 miles west of the Needles. It is certain that a good many claims which were located there some three or four years ago, have recently been relocated, the old locations having expired by limitation of law there, on or before the 1st of Jan., 1886. The rock is silver bearing, and judging from the "indications" there is some good ore there, but whether in quantity or quality to pay for the shipment is the problem for solution in the near future. Mr. Heise, of this place, is arranging to ship a carload to the mill in Kingman, to test the value of the ore in his mine. Other parties are simply awaiting the result of this shipment before making expensive outfits to prospect their claims.

There has been some ore shipped from the rich mines near the old camp called Providence, which passed through here a day or two ago, that will run way up into the thousands of dollars per ton. This was from Arrowhead district, 16 miles from Providence.

Trinity.

BULLYCHOOP.—Trinity Journal, Jan. 23: To Mr. W. C. Davis, who was in town this week, we are indebted for the following from the Bullychoop district: The Pound Cake (of which Mr. Davis is a part owner) is still as prosperous as ever, and producing bullion right along—all the clean up having been most satisfactory. They are at present down 160 feet on the lode, which will run from 6 to 7 feet in width. They have a 5-stamp mill, and it is the intention to add five more stamps in the spring; also to double their force in the mine. The Red Bluff Company have three lodes which show up remarkably well, and the company have recently purchased a steam mill, concentrator and rock breaker, which will be hauled to the district and erected before long. On the Central, Titus & Grant have a force of men running a tunnel night and day and expect to tap the ledge shortly. Other mines in the district look bright and encouraging and some new discoveries

have been made. Recently quite an extensive ledge was found on Jerusalem creek by a man named Wagoner, which prospects flatteringly, and he has sold a half interest in the "find" to a San Francisco party for \$1000. There are now three mills there—Pound Cake, Little Gem and Central, the Red Bluff mill not yet being planted. Bullychoop, so our informant says, is attracting considerable attention, and will have quite a boom the coming spring and summer.

DEADWOOD.—Ike Diener has leased the Last Chance mine from the Brown Bear Company and running at present a fifty foot tunnel to tap the ledge. Good ore was at one time found in this mine but was not followed to any extent for some reason. George Van Matre has purchased an interest in the West-lake mine and is extracting splendid ore. Francis Balleau has struck a very rich and promising ledge in his lower tunnel. The ore is rich in galena sulphurets which assays into the hundreds. Wm. Blagrove has found the east extension of his mine which shines with the "yaller truck." Good clean-ups are continually the result of this mine. Lamb & Co. have struck it big in their lower tunnel. This mine is leased from the Brown Bear Co. George Hahn is opening on a ledge, in which Jake Paulsen is interested, that prospects well. The ledge is large and gives evidence of permanence. It is also rumored that lower tunnels will be soon run to tap the Brown Bear and Barted mines, and thus will Deadwood be alive next spring. C. J. Blakemore, on Jennings Gulch, has struck his ledge in the lower level which proves as good as in former days. The ore has been given an arastra test and works over \$700 per ton.

NEVADA.

Washoe District.

GOULD AND CURRY.—Virginia Enterprise, Jan. 23: At the Osborn shaft, owned jointly by this company and the Best and Belcher, the ponderous hoisting works were started into operation again on Sunday last, after a rest of nearly a year. The machinery worked smoothly and well. The shaft was found to be in better condition than was anticipated. The timbers have to be eas-d in places and the lagging renewed. The tank on the 1600 level was found to be so badly decayed that a new one is being constructed in its place. The main pumps are all right as far down as the 1800 level, and the water was found to have risen in the shaft to a point 63 feet below that level. After the repairs to the shaft are completed the water will be reduced by means of a donkey pump sufficiently to reach the pumps on the 2000 level, after which the powerful pump engine in the surface works will be started into operation. The shaft being 2700 feet deep, 837 feet of water will have to be pumped out before bottom is reached, after which sinking deeper will be in order, the objective point being to sink to a level corresponding with the 3200 of the Combination shaft.

HALE AND NORCROSS.—The principal work is concentrated in sinking the deep winze below the 3100 level. It is now down 68 feet below that level, following the dip or inclination of the ledge, with its bottom or face in dry vein matter, carrying strata and bunches of good ore. Very good progress is being made in sinking the winze, and it will reach the 3200 level at least as soon as the Combination shaft will. The bulkhead constructed jointly by this and the Chollar mine on the 2800 level to stop the heavy flow of water from the southward was completed yesterday. It is a massive piece of stone work, well constructed, and after a few days' rest in order to let the cement harden, it will be closed, when no more water is expected to flow from that quarter.

CHOLLAR.—The tank station below the 3100 level at the Combination shaft will be completed tomorrow. The material for the tank is all framed, cut and ready, and it will be put in place in very short order. The Cornish pump will be lowered to that point during the coming week, after which sinking the main shaft will be resumed. As stated in our last report, the bottom of the shaft is now 55 feet below the 3100 level.

OPHIR.—The west drift on the 300 level, from the Mexican shaft has been advanced 49 feet from the station. This drift, being but just started, has not got into the true merits of the ledge as yet. On the 700 level the drift to the northwest, run conjointly with the Mexican and Union companies, is making good progress, as described under the Union Consolidated head.

CON. CALIFORNIA AND VIRGINIA.—About 300 tons per day has been the average output of ore during the past week, giving an average assay of about \$17 per ton. The drift being run to the northwest on the 1650 level, toward the old bonanza ore stopes, is now in 483 feet, and making excellent progress in good working ground.

CROWN POINT.—About 400 tons has been the general daily average ore yield from this mine and the Belcher, which works through it, but owing to the severe storm impeding transportation to the mills, the production has fallen off somewhat, and less miners are employed.

UNION CONSOLIDATED.—The east crosscut on the 500 level is now in 520 feet, with no change in material since last week's report. On the 700 level the joint Mexican and Union drift running northwest from the Ophir shaft has been extended 47 feet, making a total of 168 feet.

MEXICAN.—The lateral drift north from the east crosscut is now in 362 feet, 22 feet having been added to its length during the week. The progress of the joint Mexican and Union drift on the 700 level is described in the Union Consolidated portion of this report.

YELLOW JACKET.—The old ore stopes and breasts are holding out and promising finely, but owing to the heavy snow impeding transportation, there is somewhat of a falling off in the daily output of ore from the mine.

SIERRA NEVADA.—On the 520 level the north lateral drift has been advanced 43 feet, making a total length of 1547 feet. Material in the face vein porphyry, with streaks of decomposed quartz and clay.

ALTA.—On the 700 level the lateral drift north toward the Benton ground is making good progress in good working vein material, showing occasional streaks and bunches of low-grade ore.

KENTUCK.—The usual amount of ore continues to be extracted from the old upper levels, with some

pediment to transportation to the mills on account of the storm.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, Jan. 23: Ore shipments to the two reduction works in town during the past week have not been either large or numerous, owing partly to the bad condition of the roads and partly to the fact that in a number of the properties of the district that are worked on a limited scale "dead" work is being done preparatory to new prospecting explorations to be inaugurated during the early spring months. The following shipments were made in the time mentioned to the Eureka Co. works: Lone Pine mine, 1½ tons; Curtis & Killen, 2½; Dunderberg, 75, and Marguerita 8½. To the Richmond works: Mohawk mine, 3½; May, 4; Morning Star, 7, and Seventy-six 5.

Cottonwood Canyon District.

NICKEL MINE SOLD.—*Silver State*, January 23: George Lovelock, the irrepressible prospector, has sold his nickel and cobalt mines in Cottonwood Canyon to an English company. The consideration is \$35,000, a part of which has been paid. It is the intention of the purchasers to work the mines extensively and reduce the ore on the ground, as nit pine wood for fuel is abundant in the vicinity of the mines.

Galena District.

SALE.—*Virginia Enterprise*, Jan. 23: J. A. Blosson has sold his chloride mine at Galena to an Eastern company, who propose erecting a thirty-ton furnace and in other ways improving the property.

Hawthorne District.

PAMICO.—*Carson Tribune*, January 23: Very cheering news comes daily from the new bonanza county. The Pamico mine, a new discovery near the Lapanta, is showing up grandly; from silver the ore has turned to rich gold, and in the Dictator, Jim Yerington's discovery, they have a five-foot ledge, the ore from which assays \$135 to the ton. Numbers of mining experts are visiting the new district, and a report comes that parties are desirous of bonding the Dictator.

Reese River District.

AUSTIN MINING MATTERS.—*Virginia Enterprise*, Jan. 23: The last weekly report of Superintendent Melville Curtis, of the Manhattan mines, Austin, is as follows: During the past week the mill has reduced 270 tons and 120 pounds of ore, of the assay value of \$58,430.62. At the Lander shaft the tribute stops on the 650, 700 and 740 levels show no particular change. More ground is being opened on the 740 level, some of which shows very good ore. At the Paxton incline the 950, 1441 and 1500 stops continue to produce about the same amount of ore, though of lower grade. At the Union shaft the east stop on the 200 level carries a ledge of very good ore, which increases in grade as the stop is worked up. The 200 shaft crosscut has cut another ledge in the face, which shows a large formation, with bunches of good ore. Drifts are being opened preparatory to prospecting the ledge. The following men have been employed during the past week. Surface men on day's pay, 55; miners on lease, 45; miners on tribute, 123; miners on contract, 6; miners on day's pay, 11; total, 223.

Taylor District.

AN IMPORTANT MINING SALE.—*Eureka Sentinel*, Jan. 23: The Monitor mine and mill at Taylor, White Pine county, was sold yesterday to the Eberhardt Mining Company, the English capitalists who have operated largely in Hamilton for the past 16 years. The owners and the original locators of the mine were State Senator Briggs, W. G. Lyons and W. N. McGill, and the one who consummated the sale for the Englishmen was Capt. Frank Drake. The consideration has not been made known, but it is believed to be at least \$200,000.

ARIZONA.

THE VULTURE.—*Prescott Courier*, Jan. 19: The Vulture mine, with its mill and all other belongings, has passed into the possession, by sheriff's sale, of Mrs. Jeony Elmore, whose husband, for some time past, has been working the mine on lease. The judgments against the Central Arizona Company, the New York incorporation owning the mines, amounted to \$30,000. Mr. Elmore bought them up, pressed them to a sale, and now, the time for redemption having expired, is sole owner. Although the New York Company were unable to make the mine pay, Mr. Elmore has been very successful since he has been a lessee. He has now interested some of the Comstock bonanza people, and work on a largely increased scale is about to be undertaken. For many years the old Vulture has poured out a steady stream of gold bullion, and although dividends on the company's stock have been long out of date, a large body of men has had steady work, and officials have enjoyed good salaries. Eight years ago Vulture shares were held at \$15, for some time past they have been quoted at just that number of cents. Under new and competent management, the mine will prove a second bonanza to its owners, who are pretty certain to recoup on the Hassayampa all the losses they have sustained at the Quijotas.

The latest news from the Sterling mill and mine, shows that the company is having a quiet but continuous success. For some time past the mill has been crushing about twenty-six tons every twenty-four hours. The ore averages from \$13 to \$14 a ton, milling value, and the net profits after meeting both mining and millage expenses, average \$50 per day. Eight men are now employed in the mine. A large quantity of ore is in sight, and the output could be doubled at once, if the capacity of the mill were such as to require it.

Engineer Wilton is in from the Callen properties, on lower Walnut Grove. He reports that a large body of water is flowing through the Hassayampa down there, and that placer miners in that vicinity are very busy. On his way in, he passed by the Oro Fino camp, where that company's dam has been put in. The water there is overflowing, and many millions of gallons are now in store, ready for the company's use as soon as they can arrange their internal troubles.

LOST BASIN.—*Montana Miner*, January 22: Mr. Luthy returned last Monday from Lost Basin, and brings good news. The Ida mine has struck very rich rock, carrying quantities of free gold. Dansby & Co. have put a force of six men on their mine a mile distant, which bids fair to compete with the Ida

in richness. Beecher's team is still out there, hauling ore from the mine to the mill. The new mill is not in perfect running order yet, as some of the machinery is defective, but experiments will continue until it works satisfactorily, and Lost Basin district bids fair to soon rank among the first camps in the county.

COLORADO.

REWORKING OLD MINES.—*Idaho Springs News*, Jan. 21: Histories of mines are always interesting. The Seven-Twenty mine on Seaton mountain is owned by Mr. B. T. Wells, an old Gilpin county man but now of Denver. Years ago this property paid well, but of late years considerable money has been spent by Mr. Wells with not very encouraging returns. The mine has been dormant for a long time. Mr. J. A. Curtis, who lately took a lease and a bond, put men to work cleaning up and taking out the water. About a month's mining has been done and 16 men working. The number of tons of ore shipped would hardly be believed, but nearly \$3000 has been taken out in less than a month, and the mine looks better every day. Mr. Curtis is a tenderfoot, and the mine has always been worked by old miners who "knew it all," and more, too. The ore vein was not run upon by the other parties; in some places they actually timbered in the richest streak of ore. The pay streak averages from four to ten inches and nets from \$100 to \$500 per ton. Mr. Wells has had several hundred dollars in royalty already. How many more mines are there in the district lying idle to-day from this very same cause?

ORE.—*Georgetown Courier*, Jan. 21: On the 60-foot level of the Nynza mine, on Democrat mountain, a vein of solid ore has been exposed, ranging from 3 to 4 inches in thickness, which according to the last mill-run yields 552 ounces silver to the ton. The stock of the Freeland Mining company was listed in the New York market on the 6th, and the first sale made at \$2. The company paid dividend No. 6, of ten cents a share, or \$20,000, on Friday last. This made a total of \$80,000 during the past year. The ore business at Idaho Springs is said to be flourishing, in spite of the mild winter and the dullness supposed to prevail immediately after the new year. The Idaho Sampling and Concentrating works are reported to be shipping an average of a carload per day, with the other mills and mines to hear from. George Dunaway & Co., lessees on the Argentine lode, Leavenworth Mt., are reported to have encountered four feet of ore, of excellent grade. The Bonanza tunnel, which, after running a long distance, recently intersected the Fred Rogers lode, has crossed to the upper wall, and drifting on the vein is now in progress, with encouraging results. The Seven-Twenty lode, Seaton Mt., is being worked under lease by J. Curtis, who has 16 men employed. Work at cleaning out the water from the shaft has been completed and the lessee has from four to ten inches of ore to work upon, which mills from \$100 to \$500 to the ton. It is claimed nearly \$5,000 worth of ore has been taken out in the past four weeks. The owner of the Cosmos group of mines on Saxon Mountain, is steadily opening up his lodes by means of the Cosmos and other tunnels. The Antelope lode, on Sherman mountain, is looking better in the upper workings. The vein of ore exposed is from two to five inches in thickness, and will mill run in the neighborhood of 500 ounces silver to the ton. The lower workings show a streak about one inch in thickness, which will mill from 130 to 500 ounces silver.

IDAHO.

BANNER.—*Statesman*, Jan. 21: The Banner mine is looking well with plenty of good ore in sight. Since the shaft was sunk last fall the mill has crushed 845 tons of ore, producing \$121,000. They have been stopping since the mill shut down and have now about 300 tons of ore out just as good as they crushed last summer, and this work will be continued until the middle of February, when the shaft will be sunk another hundred feet; this will make the Banner mine have a 400-foot shaft. The Silver Chief mine, under the superintendency of James Monroe is making splendid progress. He is putting down a two-compartment shaft which is now down 150 feet; and will be sunk down 100 feet more; when they will run levels east and west and make ready for stoping in the spring. The Payette mine is looking well. Hon. James White is running a tunnel in one of these claims he ran across a well-defined body of ore about one foot wide. Last but not least are the Silver district mines, twenty miles from here and by far the richest looking mines in the country. Therefore a wagon road will be a very essential thing for this section.

DEADWOOD DISTRICT.—*Idaho Messenger*, Jan. 16: Our old time friends, Sam'l Boone and Jack Sheridan, who are very thorough and skilled in the prospecting work, have, with five other parties, been exploring the ranges from Sawtooth mountains to the old Deadwood placers, and even beyond to the west, and altogether have made 26 locations, which they are satisfied will prove rich. They organized a new district which they named Deadwood. Their main locations are about 40 miles south of west of the old Cape Horn house. The ores are silver and gold without any smelting ores associated—silver predominating, and all is milling, the gold free-milling. Messrs. Boone & Sheridan made 13 locations, of which 11 are silver and two are gold. They located five in the immediate vicinity of old Deadwood, two about six miles west, and six other lying six miles east, or towards Cape Horn. The five other gentlemen in this new field, who were exploring in the same region, made 13 locations; 12 silver and one gold—mostly in the vicinity of old Deadwood. There have been made between 80 and 90 assays of the silver ores of these locations, resulting in an average of 65 ounces, and ranging from 35 to 400 ounces. The silver is in sulphide and chloride form. Messrs. Boone and Sheridan visited Challis, and Mr. B. gave us the items of this new region. His opinion is that the new field will be rich and lasting, although it is a matter of judgment, as little development work has been done.

THE WASHINGTON.—*Idaho Statesman*, Jan. 21: This mine is situated on Quartz gulch a quarter of a mile above the town of Atlanta and is the property of Judge J. D. Heath. Mr. Heath was once an owner in the Last Chance mine and has been engaged in mining in that camp for the last 20 years. The At-

lanta, Tahoma, Last Chance, and in fact all the famous mines of Atlanta, are situated on Quartz gulch, from a quarter to a mile and a half above the Washington ledge. Two tunnels are started into the mine. The tunnel crosses the ledge 25 feet from wall to wall and then runs on the ledge northeasterly 35 feet. On the last 35 feet Judge Heath has taken out 100 tons of rock which he now has at the mouth of his tunnel. It is gold ore, carries sulphurets of gold and will require roasting before it is worked, but has no rebellious ores and will work very near its assay value under the roasting process. Judge Heath says that the average of the ore from the full width of the ledge is \$100 to \$150 per ton in gold and only \$4 in silver. He intends to run this tunnel thirty-five feet further when he hopes to strike a chimney that has been prospected from the top and shows very rich gold ore. He will then be 250 feet from the surface following the dip of the ledge.

Judge Heath has two other leads on which he keeps up the representative work, but this Washington is the best developed and Mr. Heath intends to have several hundred tons of ore crushed as soon as he gets to work in the spring. The mine would yield ore sufficient to keep a 20-stamp mill running for years.

MONTANA.

BANNOCK NOTES.—*Cor. Inter-Mountain*, Jan. 23: O'Leary & Gallagher, owners of the Kent mine, Blue Wing district, are working eight men on a high grade ore body, and have cut about fifty tons ready for shipment. The Polaris mine, Lost Cloud district, shipped upwards of \$35,000 worth of ore in 1885, and is now working sixteen men and shipping two carloads of ore per week to Omaha. A new boiler has been added to the former power. Sinking the shaft 100 feet deeper will commence in a few days. About 90 tons of good milling ore valued at \$30 per ton lies on the dump. Frank Williams & Co. have out over 30 tons of ore at the Simpson mine, Elk Horn district, which is being hauled to Red Rock for shipment. It is reported that Carhart's mine and mill, near Marysville, will soon be started up again. Considerable prospecting for gold is being done along Grasshopper creek this winter. I learn that placer mining will be started here in the spring. The bed of this stream has never been prospected, except in two or three places in all of which gold was found and good results may be looked for.

BUTTE MINES.—*Inter-Mountain*, Jan. 20: The recent cold weather has naturally decreased the activity of mining affairs, especially among the smaller mines; but as this is merely temporary it cannot be justly said that the outlook is less favorable than at any time during the month. The principal mines of the district are working as usual with no marked changes to record save a few exceptions where delay has arisen from breakages in machinery. A 20-horse power engine has been put in place on the "Nettie" mine, which joins "Burlington" on the east, and work has begun. The Union Consolidated has ordered timbers for sinking two hundred feet deeper. Work will begin at once. The Lexington shaft is still being sunk to reach the one thousand foot level. The main shaft is now 430 feet deep. During the last thirty-four days this mine produced 9,205 tons of ore averaging 12 per cent copper, and a small amount of silver, per ton. The mine is looking well in the lower workings. About 130 men find employment here when the mine is being worked. The Parrot company has now also some 200 men at their smelter. The Anaconda company thinks, no doubt justly, that their affairs are their affairs and not the public's—but "a cat may look at a king" and at least draw a fine conclusion. With this for a safeguard, we venture to say, from all we can hear and see, that their regular remarkable production has not recently decreased. Everything appears as usual, and there has been no appreciable decrease in the number of men employed.

The North Star will, so it is said, soon be working again. The ore will probably go to the Dexter mill. No change of importance at the Moulton nor at Clark's Colusa. Every thing is reported in a satisfactory condition. The Bell smelter is reducing daily from 35 to 40 tons of Liquidator concentrates, which yield about twenty tons of matte. The Butte City sampling mill has felt the effect of the cold weather somewhat in its usual receipts of ore. This mill offers an excellent chance for the miner to get a perfectly fair sample of his ore, have his assays made at public offices, and sell to the highest bidder.

NEW MEXICO.

MILL AND SMELTER.—*Silver City Enterprise*, Jan. 15: The Meritt stamp mill, near Socorro, is again in operation. A smelter is one of the contemplated enterprises for Hanover district. Platt McDonald shipped 16 tons of ore from the Black Hawk mine yesterday. The ore will average about \$250 per ton. Word from the East says that there is still some probability of a mill being erected to work the ores of the Gold Hill mines. Alex. McGregor is doing considerable development work on one of his promising mines in Hanover gulch. Steve Upton is in charge. Eaton and Caples this week shipped their first carload of ore from the Willis mine. It is principally a lead carbonate and will give the shipper handsome returns for their labor. Work is being resumed on the Sumner group of mines in the Bald mountain district. There is a fair showing of good ore, and the present operator hopes to make the property produce profitably. The bullion production of the three principal Tombstone companies, for the year 1885, is as follows: Grand Central, \$638,077.63; Contention, \$206,173.87; Tombstone Mill and Mining company, \$432,044. The machinery for the McGregor mill will arrive at Deming

in a few days. The boiler has already arrived and is in place. The mill will be in charge of John Spiller, who has been connected with the Mimbrès mill for several years. Jack Clark, an old Georgetown miner, has struck it rich in Sabinal. P. O. Towor and Mike Hughes, of Georgetown, are "in" on the strike, which is said to rank next to the Mose Stevens bonanza, the one that first gave the camp notoriety in this section. Information from Carlisle is to the effect that the company's mine has been paying handsomely for the last three months, and that the future for the camp is very bright. The east camp is soon to have a five-stamp mill. As soon as the Apache troubles are ended good times may again be looked for over there. The new strike in the Merrimac mine in Stein's pass is turning out all that was expected of it, and will prove a bonanza to the owners.

OREGON.

THE MILL.—*Oregon Sentinel*, Jan. 20: Mr. L. D. Brown, of Portland, arrived here Thursday, to select a site for the new quartz mill to be erected here. Some of the mill has arrived, and a portion of the timbers have also been finished. Mr. Brown thinks our roads are so bad at the present time that not enough quartz could be hauled to the mill if it were in operation now, and this has been the main cause of not shipping the mill. It will be run as a custom mill, for a time at least, and Mr. Brown says as wind alone will not run it he must watch every turn to make it a success.

QUARTZ AND PLACER.—*Jacksonville Times*, Jan. 22: Wagner creek expects to have a quartz mill in the near future. The miners have considerable water now, and are making the most of it. Some excellent quartz is being taken out of several ledges in Southern Oregon. The disagreeable weather of the past week has temporarily checked prospectors. The rains of the past week have afforded a large amount of water, over which the miners rejoice greatly. Simmons, Ennis & Co.'s huge mining enterprise, near Waldo, is moving ahead in fine style, and the great cut is steadily growing larger. Ragdale & Co., of the Fort Lane district have been working steadily, and have a considerable amount of quartz on the dump, which prospects well. This general prospecting of Jackson and Josephine counties is certain to result in much good, as several parties will no doubt strike very rich quartz ledges. The Wagner creek region is said to be plastered over with location notices, so busy have the prospectors been. Some good quartz mines exist there. Reports reach us that some very rich rock is being taken out in the Blackwell district, some of which is being pounded up in a mortar and yields extraordinarily well. Josephine county miners are generally busy having plenty of water. That section is one of the best mining camps on the coast and only lacks development to prove its great richness. The Jacksonville Mining Company have three men at work running a tunnel to strike the old Bowden ledge at a favorable place. The reduction work at Medford have been started up again, after a suspension of sometime to permit the putting in of five stamps, a new concentrator and other machinery. Supt. Chick assures us that the best of work will be done henceforth. D. P. Thompson and other Portland capitalists are about starting reduction works at the metropolis on a large scale. Messrs. Kocher and Brant of the O. & C. R. R., who paid this section a visit recently, seem to be satisfied that Southern Oregon will prove one of its very best customers. The Sterling mine has been running continuously for some time past and an eight months' season seems well nigh assured, as a great deal of snow has already fallen at the head of the ditch. Operations are kept up day and night, excepting that no work was done after dark during the cold spell. We are informed that Henry Klippel and Tbos. Chavner will build a mill in the vicinity of Gold Hill for the purpose of working over the tailings coming from their ledge in early days.

UTAH.

STAR DISTRICT.—*Pioche Record*, Jan. 20: It has been the prevailing idea that the mining operations over in Star district, Utah, had proven a failure, but such is not the case. An organization has been lately formed in Salt Lake City, with M. Cullen, A. G. Campbell, Dennis Ryan, J. E. Dooley, H. T. Duke and W. C. Hall as stockholders, and is known as the Star Mining Company, to work mines in the Star mining district. With those millionaires as its backing, and all practical miners, the Star Company starts out with brilliant luster.

THE CHRISTY CO.—*Southern Utah Times*, Jan. 22: There has been no developments of note made in the California during the past week, except that there has been considerable improvement in the grade of ore in the stops on the 400 south. The ore body in the drift north, at a point nearly 20 feet from the uprise above the 250-foot level in the new shaft, has opened out to a width of three feet. The ore is black and high grade in quality. The mine furnished an average of 10 tons per day to the mill during the week. The mill has been crushing an average of 40 tons of ore daily during the week, and, notwithstanding the severe weather which struck this section of late, the stamps have not been hung up for a moment. This speaks well for the present management.

THE STORMONT CO.—Work has been resumed in the face of the main incline in the Buckeye & Savage. It is now down 695 feet from the surface. The ore streak continues to the bottom of the incline, and the ledge matter is similar to that in the old workings which carries the ore bodies. The River Mill was shut down last Saturday on account of the stormy weather having rendered the roads so soft that the teams could not haul ore from the mines. A full force has been kept on at the mines, however, and the regular quota of ore has been hoisted.

OTHER NOTES.—There is a rumor current in mining circles here to the effect that the property of the Christy Co. will be sold to a syndicate of California capitalists in the near future. A party up from St. George reports that 11 feet of 66 per cent copper ore was lately struck in one of the Apex Company's mines, and that an attempt will be made to induce the company to resume active operations on the property. Last year, some private parties extracted \$7000 worth of ore from the mine in a short time, and it is thought that with the advance price of copper and with proper management, it can be made to pay well.

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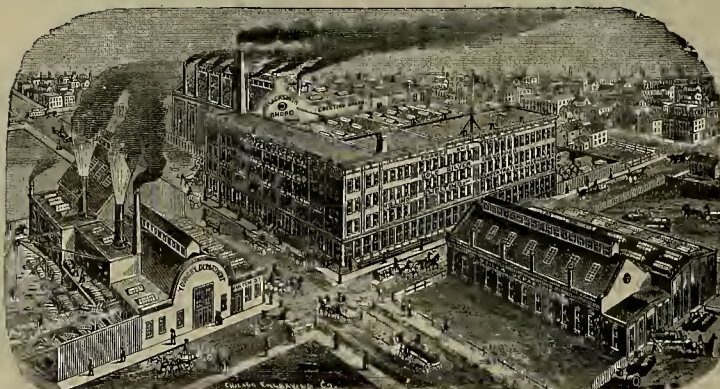
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The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Day Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Day Street, New York.
[From the Engineering & Mining Journal, Aug. 3, 1885.]
The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

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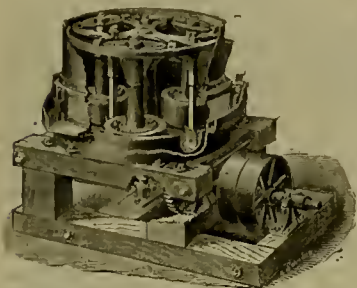
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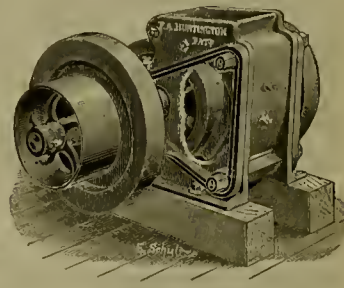
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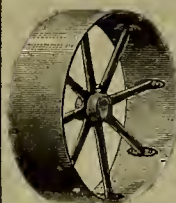
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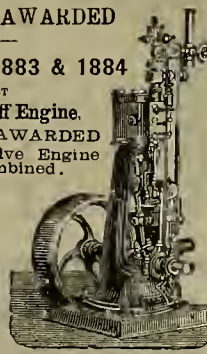
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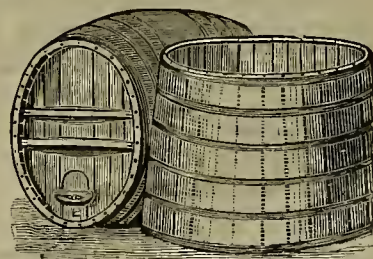
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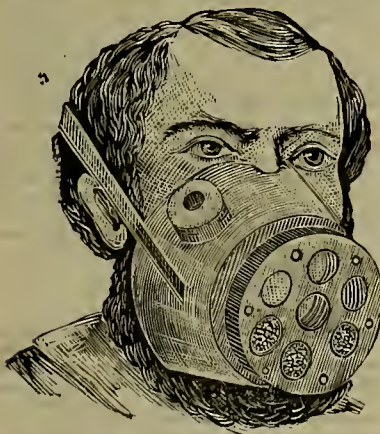
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Orders Promptly Executed.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco:

BONITA S. M. Co., Jan. 24.—Capital stock, 10,000,000. Directors—James J. E. Hawkins, N. Messer, Joseph Marks, Joseph Bernhard, Charles Hirschfeld.

WEST COAST OIL Co., Jan. 24.—Capital stock, \$1,120,000. Directors—Willard B. Farwell, H. C. Wilson, J. N. Hall, George L. Brown, Charles A. Warren, George D. Nagle and Frank D. Culver.

TULARE LAKE AND KINGS RIVER CANAL Co., Jan. 24.—Object, to carry on irrigation projects in various counties of the State. Capital stock, \$3,000,000, in 600,000 shares. Directors—George L. Brown, H. C. Wilson, Calvin Brown, J. H. Miller and J. P. Jenkins.

HILDBRETH MINING Co. January 18.—Location Fresno county, capital stock, \$10,000,000. Directors—Thos. Hildreth, J. P. Sargent, Adam Herold, E. A. Davidson and John Sevenoaks.

GILROY G. MINING Co. January 19.—Location Butte and Plumas counties. Capital stock, \$10,000,000. Directors—J. P. Sargent, Samuel Rea, E. A. Davidson, Adam Herold and George Seaman.

THE SELBY SMELTING AND LEAD COMPANY has filed a notice of the increase of its capital stock from \$200,000, divided into 2000 shares, to \$600,000, divided into 6000 shares.

Meetings and Elections.

SAN FRANCISCO COPPER Co., Jan. 27.—M. A. De Leveja, P. W. Ames, R. E. Doyle, E. J. Le Breton, Antoine Borel. W. C. Reveal was re-appointed superintendent, and R. H. Pond, secretary.

BELCHER SILVER MINING Co., Jan. 27.—Directors—Jas. Newlands, A. K. P. Harmon, J. H. Dobinson, J. P. Martin and Geo. D. Edwards. At the organization of the directors, Jas. Newlands was elected president, A. K. P. Harmon, vice-president, John Crockett secretary and S. L. Jones superintendent. Cash on hand, Jan. 1, 1886, \$2,787.82.

BADGER HILL MINING Co.—This Nevada Co. mining company has completed its re-organization by the election of a board of directors and officers. The directors chosen were Edward Coleman, Peter Johnston, Denis Meagher, Jno. F. Kidder and Alfonso Morehouse. Edward Coleman was elected president of the company, Peter Johnston treasurer, and Henry B. Johnston secretary.

MARYLAND MINING Co., Jan. 24.—Directors—S. P. Dorsey, John C. Coleman, Edward Coleman, Samuel Bethell, Stephen Moore. President and superintendent, S. P. Dorsey; treasurer and secretary, Samuel Bethell.

Mining Share Market.

The transactions in mining shares seem to be growing smaller and smaller and the prices realized are about in the same condition. Notwithstanding the exploratory prospecting work on the Comstock, and the hopeful feeling there, the market here is not at all buoyed up. The supply of water for driving the big hydraulic pump is now unlimited, and it is doing excellent and very effective work. Sinking the deep winze below the 3100 level of Hale & Norcross goes steadily ahead, and good bunches of ore are still met with. The preparations for sinking the Osbiston shaft of the Gould & Curry and Best & Belcher Companies are actively being promoted. The ponderous machinery of the hoisting works at the shaft was started into operation on Sunday last, after a rest of about a year, and started off all right. On Sunday steam was turned into the cylinders of the pump-engine on the surface of the Osbiston shaft and the ponderous machinery tested. It made several revolutions and moved smoothly, turning over without a jar. The donkey pumps were started at the water level and have cleared the second line of pumps below the Suto tunnel level. The main pump engine on the surface was set in motion and the work of draining the shaft begun. It will require until March 1st to drain it to the bottom, or 2500-foot level, according to a careful estimate of the volume to be lifted to the Suto tunnel level.

Bullion Shipments.

Con. Virginia and California, January 24. \$52,077; Argus, 17, \$4514; Koebig's mill, 24, \$450; Lexington, 18, 20,080; Moulton, 18, \$55,760; Silver Bow, 18, \$20,304; Moulton, 22, \$11,968; Alice, 22, \$22,224; Germania, 21, \$2884; Hanauer, 21, \$3240; Germania, 22, \$3565; Hanauer, 22, \$5400; Crescent, 22, \$3300; Germania, 24, \$2933; Crescent, 23, \$2900; Hanauer, 24, \$2700; Germania, 26, \$5073; Alice, 26, \$5826; Hanauer, 26, \$6350; Stormont, 26, \$2500; Queen of the Hills, 26, \$1100. The banks of Salt Lake City report the receipt for the week ending January 20th, inclusive, of \$2,048.27 in bullion and \$38,410 in ore, a total of \$40,458.27.

CAUTION! Purchase your spectacles from C. Muller, 135 Montgomery St., near Bush. x

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Best & Belcher M Co.	Nevada.	33.	59.	Jan 6.	Feb 10.	Mar 9.	W. Williams.	309 Montgomery St.
Belcher Con M Co.	California.	3.	30.	Dec 23.	Jan 25.	Feb 27.	J. Connor.	501 Sansome St.
Chollar M Co.	Nevada.	19.	50.	Dec 30.	Feb 25.	Mar 25.	C. E. Elliott.	309 Montgomery St.
Champion M Co.	California.	20.	10.	Dec 23.	Jan 25.	Feb 25.	T. Weitzel.	522 Montgomery St.
Eureka Con M Co.	Nevada.	8.	100.	Dec 18.	Jan 12.	Feb 10.	E. H. Wilson.	323 Montgomery St.
General Loe M Co.	Arizona.	2.	01.	Nov 28.	Jan 9.	Feb 8.	C. E. Gillet.	628 Montgomery St.
Golden Fleece M Co.	California.	4.	20.	Dec 9.	Jan 15.	Feb 5.	F. Schirmer.	Phelan Block
Gould and Curry S M Co.	Nevada.	51.	25.	Dec 4.	Jan 8.	Feb 1.	A. K. Durbrow.	309 Montgomery St.
Hathaway Hyd M Co.	California.	8.	45.	Dec 8.	Jan 18.	Feb 8.	J. H. Moore.	Montgomery Block
Mexican Development Co.	Nevada.	33.	10.	Dec 8.	Jan 17.	Feb 1.	A. C. Nunez.	708 Montgomery St.
Manhattan M Co.	California.	15.	10.	Dec 12.	Jan 30.	Feb 30.	A. B. Brady.	Grass Valley
Navajo M Co.	Nevada.	14.	30.	Jan 9.	Feb 15.	Mar 8.	J. W. Pew.	310 Pine St.
Pennsylvania Con M Co.	California.	3.	04.	Dec 8.	Jan 25.	Mar 25.	M. Byrne Jr.	309 Montgomery St.
Peerless M Co.	Arizona.	6.	22.	Jan 11.	Feb 12.	Mar 2.	A. Waterman.	309 Montgomery St.
Perrin M Co.	California.	4.	10.	Jan 11.	Feb 15.	Mar 6.	A. Waterman.	309 Montgomery St.
Pine Tree M Co.	California.	1.	15.	Dec 22.	Jan 27.	Feb 15.	C. A. Buffington.	309 California St.
Savage M Co.	Nevada.	65.	50.	Jan 4.	Feb 9.	Mar 1.	E. B. Holmes.	309 Montgomery St.
Sierra Nevada M Co.	Nevada.	84.	25.	Jan 5.	Feb 9.	Mar 1.	E. L. Parker.	309 California St.
Union Con M Co.	Nevada.	84.	25.	Jan 15.	Feb 15.	Mar 15.	J. M. Buffington.	309 California St.
Virginia Creek Hyd M Co.	California.	5.	05.	Dec 14.	Jan 18.	Feb 11.	J. M. Quay.	406 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Con Amador M Co.	California.	F. B. Latham.	327 Pine St.	Annual.	Feb 1
Cibola Creek M Co.	California.	W. Willis.	309 Montgomery St.	Annual.	Feb 1
Father de Smet M Co.	Dakota.	H. Deas.	309 Montgomery St.	Annual.	Feb 4
Holmes M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	Annual.	Feb 9
Manhattan M Co.	Nevada.	J. Crockett.	327 Pine St.	Annual.	Feb 9
Standard Con M Co.	Nevada.	W. F. Foy.	310 Pine St.	Annual.	Feb 9
Wm Fenn M Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	Annual.	Feb 2

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Caladonia M Co.	Nevada.	W. I. Oliver.	328 Montgomery St.	10.	Jan 22
Jackson M Co.	California.	D. C. Bates.	424 California St.	25.	Oct 5
Manhattan M Co.	Nevada.	John Crockett.	419 California St.	25.	Jan 20
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Jan 15
Syndicate M Co.	Nevada.	J. Stadfeld Jr.	419 California St.	10.	Dec. 21

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.				Red Bluff.				Sacramento.				S. Francisco.				Los Angeles.				San Diego.			
	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.
Jan. 27.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.
Thursday .....	.69	27	NW	Cy.	.02	54	S	Cy.	.32	55	S	Fr.	.63	58	S	Cy.	—	—	—	—	—	—	—	—
Friday .....	.63	28	N	Cy.	.45	53	S	Cy.	.70	56	SE	Cy.	.52	60	W	Cy.	—	—	—	—	—	—	—	
Saturday	1.45	34	S	Cy.	.53	51	SE	Cy.	.73	52	SE	LR	1.12	61	S	LR	—	—	—	—	—	—	—	
Sunday .....	.39	46	S	Cy.	.13	56	SE	Cy.	1.85	57	SE	Cy.	1.30	59	SE	Cy.	*	60	S	LR	—	62	W	Cy.
Monday .....	.51	48	S	Cy.	.13	53	S	Fr.	.30	60	S	Cl.	.66	59	E	Cl.	1.00	65	W	Cy.	*	64	W	Fr.
Tuesday .....	.67	44	S	HR	.12	52	SE	Cy.	.02	52	S	LR.	.23	53	SE	LR	.00	63	E	Cy.	.06	61	NW	Cl.
Wednesday .....	.66	48	S	Cy.	.48	56	SW	Cy.	.85	55	SW	Cy.	.76	58	N E	Fy.	.00	60	W	Fr.	.00	60	NW	Fr.
Totals	5.00				1.88				6.27				4.27				.48				1.35			

EXPLANATION.—Cl, for clear; Cy, cloudy; Fr, fair; Fy, foggy; — indicates too small to measure. Temperature wind and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 7.	WEEK ENDING Jan. 14.	WEEK ENDING Jan. 21.	WEEK ENDING Jan. 28.
Alpha.....	..	.30	.30	.35
Alta.....	.15	.15	.25	.20
Andes.....	..	.20	..	..
Argenta.....	..	..	..	..
Baldwin.....	1.10	20.10	1.10	..
Belcher.....	..	..	..	1.00
Best & Belcher.....	.80	.35	1.05	.80
Bullion.....	..	.30	.25	.30
Bonanza King.....	..	..	..	..
Belle Isle.....	..	..	..	..
Bodie Con.....	1.90	2.00	1.70	1.80
Benton.....	..	..	..	..
Bodie Tunnel.....	..	..	..	..
California.....	.60	.55	.55	.45
Challenge.....	..	..	..	..
Champion.....	..	..	..	..
Chollar.....	.50	.80	.50	.75
Cibola.....	..	.55	..	.30
Con. Imperial.....	..	..	..	..
Con. Virginia.....	1.40	1.60	1.60	2.25
Con. Pacific.....	.50	.55	.45	.50
Crown Point.....	.75	.80	.70	.75
Day.....	1.50	1.65	1.70	1.15
Eureka Con.....	1.50	1.65	1.70	1.15
Eureka Tunnel.....	..	..	..	..
Exchequer.....	..	.10	.15	..
Grand Prize.....	..	.25	..	..
Gould & Curry.....	.50	.70	.75	.80
Goodshaw.....	..	..	.25	..
Hale & Norcross.....	1.75	2.00	1.60	2.15
Holmes.....	.11	.11	.10	.10
Independence.....	..	..	..	..
Justice.....	..	..	..	..
Martin White.....	..	..	..	..
Mono.....	4.70	5.25	3.75	5.00
Norfolk.....	.35	.40	.25	.45
N. D. Diabolo.....	3.50	..	..	..
Northern Belle.....	..	..	..	..
Navajo.....	..	.30	.30	..
Norfolk.....	..	.10	.25	..
Osbiston.....	..	.65	.10	.80
Ophir.....	.50	.60	.55	.70
Overman.....	..	.15	.15	..
Potosi.....	.40	.50	.35	.40
Practical Con.....	..	..	..	..
Sage.....	..	..	..	..
Seg. Belcher.....	..	..	..	..
Sierra Nevada.....	.50	.55	.40	.50
Silver Hill.....	..	..	.05	..
Silver King.....	..	..	..	..
Scorpion.....	..	.05	..	..
Syndicate.....	..	.15	..	..
Tioga.....	..	..	..	..
Union Con.....	.30	.35	.25	.40
Utah.....	.85	..	..	..
Yellow Jacket.....	.25	.30	.20	1.00

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Jan. 28.	650	Hale & Norcross.....	2.40
50 Andes.....	150	300 Mexican.....	3.50
750 Alta.....	150	650 Mono.....	4.00
300 Belcher.....	100	100 Ophir.....	55c
355 B. & B.....	100	100 Ophir.....	55c
280 Bodie Con.....	1.70	100 Peerless.....	10c
60 Crown Point.....	70c	145 Potosi.....	35c
325 Eureka.....	30c	100 Savage.....	7.00
50 Con. Pacific.....	40c	90 Silver King.....	7.00
50 Con. Va. & Cal.....	2.05	100 Sierra Nevada.....	40c
50 Eureka Con.....	2.20	90 Silver King.....	7.00
540 Gould & Curry.....	70c	50 Union Con.....	25c

E. C. McNEIL, of Austin, has shown the *Reveille* some fine specimens of both gold and galena ores, just brought in from mines owned by himself and others in the Carson and Colorado section. These mines are in range with the Lapanta discoveries, twenty-two miles distant. The gold is free and can be seen in the specimens.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING JANUARY 19, 1886.

- 334,634.—OINTMENT—Berry & Butler, S. F.
 334,516.—GATE—Depp & Selby, Marysville, Cal.
 334,650.—SKYLIGHT—Jos. F. Forde, S. F.
 334,651.—SKYLIGHT—Jos. F. Forde, S. F.
 334,525.—DIAL FOR TIME PIECES—A. O. Gott, S. F.
 334,600.—DAMPER REGULATOR—McDonald & Townsend, Portland, Or.
 334,601.—DAMPER REGULATOR—McDonald & Townsend, Portland, Or.
 334,539.—OINTMENT—Musgrave & Barton, Oak Bar, Cal.
 334,675.—CIRCULAR ORE STAMP BATTERY—A. B. Paul, S. F.
 334,467.—NECKSCARF—S. Popper, S. F.
 334,547.—SHAFT COUPLING—John Richards, S. F.
 334,739.—SAW JOINTER—C. Schoch, Truckee, Cal.
 334,622.—TOY THEATRE—J. W. Sherman, S. F.
 334,486.—FRUIT PICKER—Strong & Smith, S. F.
 NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SKYLIGHT.—J. F. Forde, S. F. No. 334,651. Dated Jan. 19, 1886. This improvement in skylights consists of one having a ridge ventilator connected with it, and openings and passages for the purpose of ventilation, with certain details of construction.

SKYLIGHT.—J. F. Forde, S. F. No. 334,650. Dated Jan. 19, 1886. This consists in a novel construction of the channeled bars by which the glass is held, air-passages for ventilating purposes and to equalize the temperature, stops for retaining the glass in place, and in certain details of construction.

OINTMENT.—Mark Musgrave and Henry J. Barton, Oak Bar. No. 334,539. Dated Jan. 19, 1886. This relates to the class of ointments for healing purposes, and is intended for chronic or old and mortified wounds, burns, scalds, etc. The ointment is self-cleansing and no water is used.

SPRAY NOZZLE.—E. J. Delaney, San Jose. No. 334,110. Dated Jan. 12, 1886. This spray nozzle is especially useful for the application of washes to plants, trees, or vines which may be infested with vermin. It consists of a tap having a discharge opening or hole made through it, one side of the tip being cut away to a line central with the opening and intersecting its end.

APPLE PARSER, SLICER, AND CORER.—Wm. McMillan, Husleton, Butte Co. No. 334,130. Dated Jan. 16, 1886. This is a parser, corer and slicer of that class in which a carriage carrying the knives for paring and slicing is advanced against and past a rotating apple, which is afterwards removed independently of its core by a swinging arm, said core also being discharged. The object is to provide a machine capable of doing more work in less time than those commonly in use.

JOINT-MARKING AND DRESSING TOOL FOR CEMENT PAVEMENTS.—Malcolm Macdonald, Oakland. No. 334,125. Dated January 12, 1886. This is a new and useful tool or implement for marking and dressing the joints of cement or artificial stone surfaces or pavements. The invention consists of a suitably handled tool having a peculiar central cutting or indenting rib or blade, and a laterally or transversely concave surface or face on each side of said rib or blade, the whole face of the tool being rounded or convex in the direction of its length. The tool is adapted to readily form the division joints, leaving them with round or convex sides and edges, and is also adapted to dress or polish the surfaces of the joints and the surfaces contiguous thereto.

CAR BRAKE.—Wm. H. Masterman, of Newark, Alameda Co. Assignor of one-sixth to A. H. Walker, Oakland. No. 333,874. Dated, Jan. 5, 1886. This device is intended for equalizing or regulating the pressure of brake-shoes upon the wheels of the cars, by which the pressure is prevented from becoming so excessive as to entirely stop the wheels, and thus ruin them by wearing them flat in spots. It consists of a bell-crane lever pivoted to the upper end of the brake-lever having one arm connected with the rod by which the power is applied, and the other carrying a weight which allows pressure to be applied to the brake to a certain point, when this weight will rise. By means of an arm connected with it and provided by an eye, which slides upon a stationary rod, a further movement of the brake is checked by the hindering of this eye upon the rod.

The concentrator recently set up at the Brunswick mill is said to have proved a success and will reduce the cost of milling low grade quartz on the upper levels of the Comstock in which gold predominates, to \$1 per ton.

Our Agents.

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 Geo. McDOWELL—Santa Clara and Santa Cruz Co's.
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THE Eureka Consolidated mine has paid 25 dividends, aggregating \$4,817,000; the Richmond 99, aggregating \$3,177,387; the Jackson—comparatively a virgin mine—7, aggregating \$35,000. These three properties are on Ruby hill, and adjoin one another.

Testing and Working Silver Ores

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of sublimated steam, preparation of dichloride of copper and protodichloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Piche's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican "Chilian process," Kroll's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Nole's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, circulating the ore, direct for filling a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

Price, post free, \$2.00. Address Dewey & Co., MINING AND SCIENTIFIC PRESS, 252 Market St.

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DELINQUENT NOTICE.

Pine Tree Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Summit Mining District, Kern County, California.

NO R.E.—There are delinquents upon the following described stock, on account of assessment (No. 1) levied on the 22d day of December, 1885, the several amounts set opposite the names of the respective shareholders, as follows:

NAMES.	No. Certificate.	No. Shares.	Amount.
Bennet, C.	9	1,000	\$ 150 00
Grisswald, A. H.	10	1,000	150 00
Grisswald, A. H.	13	1,000	150 00
Grisswald, A. H.	14	1,000	150 00
Grisswald, A. H.	15	500	75 00
Grisswald, A. H.	05	500	75 00
Grisswald, A. H.	06	250	37 50
Grisswald, A. H.	07	250	37 50
Grisswald, Mrs. A. H.	8	1,000	150 00
Grisswald, Wm.	17	500	75 00
Grisswald, M.	18	500	75 00
Grisswald, Harriet B.	10	500	75 00
Wilson, W. C.	7	20,000	3,000 00
Wilson, W. C.	20	1,000	150 00
Wilson, W. C.	21	1,000	150 00
Wilson, W. C.	22	1,000	150 00
Wilson, W. C.	23	1,000	150 00
Wilson, W. C.	24	1,000	150 00
Wilson, W. C.	25	1,000	150 00
Wilson, W. C.	26	1,000	150 00
Wilson, W. C.	27	500	75 00
Wilson, W. C.	28	500	75 00
Wilson, W. C.	29	500	75 00
Wilson, W. C.	30	500	75 00
Wilson, W. C.	31	100	15 00
Wilson, W. C.	32	100	15 00
Wilson, W. C.	33	100	15 00
Wilson, W. C.	34	100	15 00
Wilson, W. C.	35	100	15 00
Wilson, W. C.	36	100	15 00
Wilson, W. C.	37	100	15 00
Wilson, W. C.	38	100	15 00
Wilson, W. C.	39	100	15 00
Wilson, W. C.	40	100	15 00

And in accordance with law, and an order of the Board of Directors, made on the 22nd day of December, 1885, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Company, room 4, No. 309 California street, San Francisco, California, on Monday, the 15th day of February, 1886, at the hour of 2 P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. M. BUFFINGTON, Sec'y.
OFFICE:—Room 4, No. 309 California St., San Francisco, California.

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ASSESSMENT NOTICE.

Pine Tree Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Summit Mining District, Kern County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 22d day of December, 1885, an Assessment (No. 1) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 4 (second floor), 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 27th day of January, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 15th day of February, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y.

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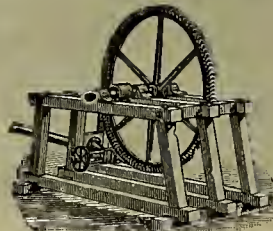
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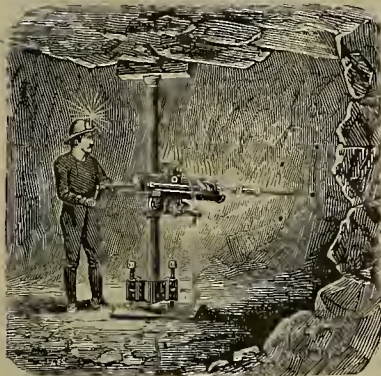
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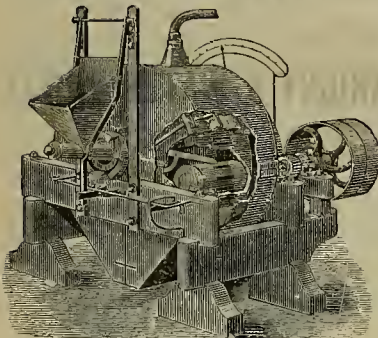
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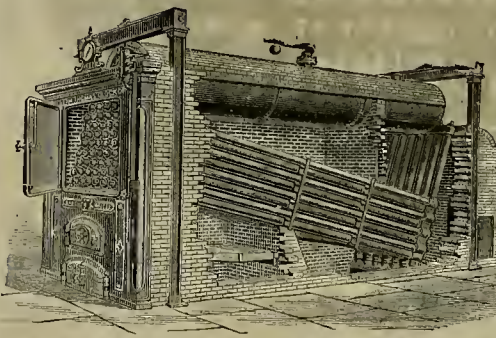
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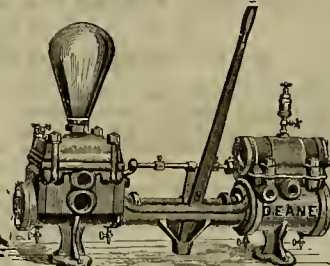
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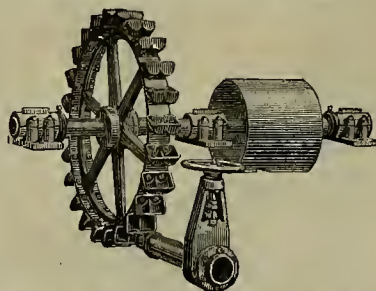
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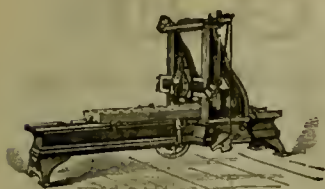
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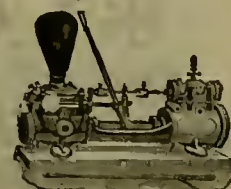
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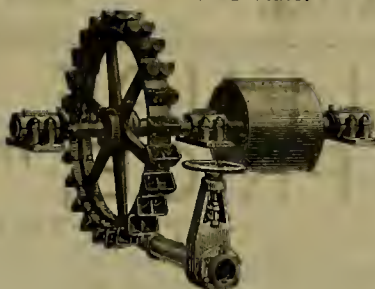
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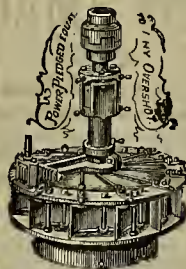
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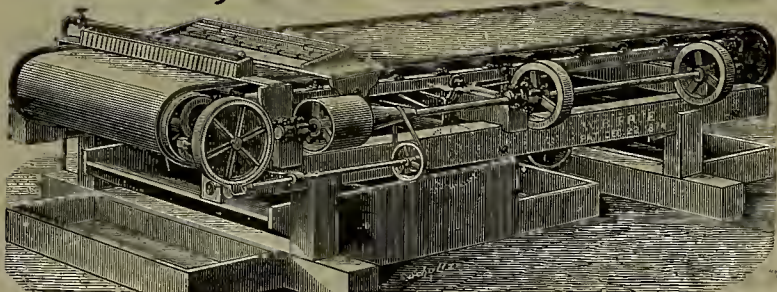
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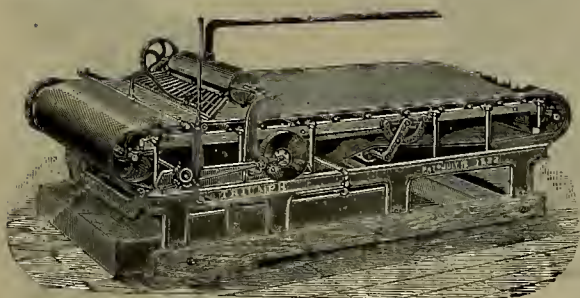
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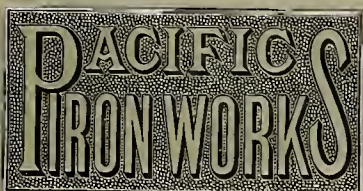
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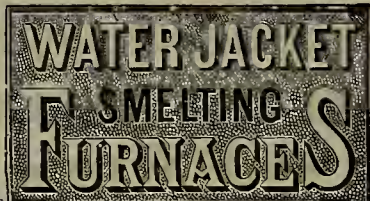
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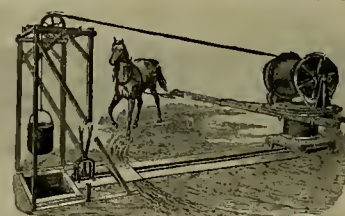
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An Illustrated Journal of Mining, Popular Science and General News.

VOLUME LI
Number 6.

THE Silver King Company of Arizona are contemplating the addition of a large lot of new machinery to their reduction works.

CORRESPONDENCE.

We admit, nnendorsed, opinions of correspondents.—Eos.

Virginia City, Nevada.—No. 1.

A General Review of the Great Bonanza Camp. Its Marvelous History. Will it Repeat Itself?

(By our Special Correspondent.)

Whilst driving along in our buggy, between old Fort Churchill and Carson City on the 24th day of Dec., last, the following incident occurred to the writer: Forcing our little steed to a steady and rapid gait, down over a long and even grade of some ten miles extent, we sought to make as soon as possible, the base of the opposite mountain, which now lifted itself in bold relief to our front. Raising our eyes suddenly, and running them along the comb of the distant range they encountered an object that appeared both impressive and surprising. Directly before us to the north, full twenty-five miles away, and some two thousand feet above the intervening plain, in distinct and full view, sat a queenly city, enthroned in her majestic mountain home. All unexpected and unheralded this city of silver temples came forth to greet us for the first time: a city wherein the engineering gods are wont to grind exceeding loud as well as exceeding slow, and fine, that silvery grist that feeds the man of commerce. It was a rare and strange meeting to us. Had we been poetical, we certainly should have dictated a few lines of verse for such an occasion as this. As it was, we felt in some measure as if we had met an old friend, who, in the calm sunlight of that remote landscape, had come forth from behind a mountain to show her smiling face. Especially might we imagine this when we were so well acquainted with a namesake and a daughter of hers, who once so kindly furnished a home and protection for us among the golden placers of Montana, in 1863. On the sun-scorched plains of New Mexico and Arizona, we had often met those deceitful atmospheric illusions, wherein towering cities floated in mid-air by the mysterious mirage, are prone to tantalize the weary traveler: but yonder, high up among the crazy peaks, gazing down from her sublime heights, could be seen a real, living city, where the mirage had become materialized, as it were, into permanent, abiding form, and where the wildest dreams of fancy could meet and find a literal fulfillment. Assuredly this was a spectacle far surpassing the famous visions of Mirza. For this city, although poised amid the clouds of heaven, justly claimed and possessed a real and substantial life, that richly adorns the home, peoples the busy marts of trade and crowds the sacred temples of worship. Yes, indeed, with her well-earned fame, that has been borne to every shore and isle of the civilized earth, there lay before us the widely known and celebrated

Bonanza City of Virginia.

Were not this first introduction so striking and unique in its order, we should still firmly believe that a place so largely historic from its bewildering output of the precious metals, could claim and would retain with no small degree of strength the gravest thoughts of the most reflective minds.

The inquiries that would naturally arise from contemplating such a city as Virginia would be:

- (1.) What is comprehended in her present sphere of activity as a mineral camp, and
- (2.) What is to be her coming destiny as such?

If the sphere of merit is proportioned to the extent of usefulness, then may Virginia City be found like Abou Ben-Adem's name of old, to rank the highest among the honored and enrolled of her compatriot sisters, and be found leading all the rest of her silvery train on these Pacific shores. Certainly, in her primeval reign, she holds the prestige of having moved the wheels of commerce and controlled the fortunes and destinies of humanity with greater force and results than any other given spot of earth so limited on the American continent. To many her

Queenly Days of Prosperity

And renown appear to have vanished forever, whilst to many others who claim to have closely and carefully scanned the more recent operations brought to hear upon the ancient Comstock lode, there comes forth to them from these lower depths an oracular voice, more distinct and intelligible than the whisperings of a Delphic sybil, and a sure word of prophecy, which it is said these subterranean argonauts are fully competent to interpret. This interpretation is declared to read thus: "In due season this dismasted bonanza craft will once more sail out of these ports, and bearing onward in a prosperous course, under favoring gales and beneath balmy skies, will once more come into a full possession of the golden and silver fleece, that has so long courted the most earnest and sanguine expectations of all on board."

That Virginia Became Discrowned,

And fell suddenly from her once exalted position, wherein she enriched a multitude of bonanza kings, now mostly fled and scattered over the face of the earth, is a fact too patent to be questioned, but that she will soon return again

in full force, to a legitimate and steady output of bullion, after having been so hastily drained and rifled of countless millions, a few years since, is the most serious and momentous question of the hour. Not being able to solve these problems with any degree of certainty, and wholly unprepared, and quite as unwilling, to write up or write down a camp of this or of any other magnitude, we prefer to give to the readers of the MINING AND SCIENTIFIC PRESS a few brief statements of our personal exploration and review of the principal and various developments of the Virginia mines.

These statements will only partake of the character of a review, and will not presume to entrench upon the details of daily reports or the minutiae of new and constant improvements going forward in and about these mines.

Before proceeding on the path of our explorations, however, it would be very much in place, at this time, to recognize the great weight of our obligation and indebtedness to this noble company of

Owners, Superintendents, Foremen,

As well as numerous toilers at the engine, shaft and drill with whom it has been our good fortune to come in contact whilst engaged in this work.

And, before leaving this point, it may as well be stated, once for all, that during our interviews, with the principal officers and operators, and some of the owners of mines in this camp, no greater expressions of courtesy and hospitality could have been shown than were tendered the writer in his effort to secure whatever information might be of value, or of interest to the public: whilst in some instances owners and superintendents have most willingly volunteered their individual services, and proffered their personal presence in going down into these wonderful shafts, and assisting to explore the labyrinthian depths of this silver mountain.

For all such generous and whole-souled courtesies and hospitalities, your correspondent herewith returns his sincere and grateful thanks. Some of these parties we shall necessarily mention as we pass along in the current of our review. For, as we have before stated, a review is all that is intended in the limited space which we have assigned to our work here, and the pressure of other duties of a business character, has necessarily rendered our work, even in this particular, of a very imperfect nature. Such a review will only include some of the more noted, active and producing mines now enlisting public attention at home and abroad, as to their present condition and future outcome. With an acquaintance of several years in the gold and silver districts of Montana, a two-years' residence at Tombstone, Arizona, and some delightful interviews with the Central City and Leadville ores, we confess to having entered upon our task bere with feelings somewhat akin to that experienced by the youth on "general muster" occasion, in the years of Lang Syne. The

Gould & Curry and Consolidated California and Virginia.

The first objects of our attention, are neighbors to each other, and occupy the more northerly portions of Virginia City. They are now operated in confederation, with several other valuable mines but of lesser note, lying adjacent to these remarkable bonanzas. This most useful coalition of these mines has been established in order to carry forward the work of prospecting, and exploring the territories adjoining, and beneath the old bonanza, more effectively and successfully, than could be accomplished by any one single-handed effort. Whilst this work of prospecting is advancing, all the hoisting machinery in the C. & C. and the Con. Virginia is being worked to its utmost capacity, to deliver ore from the lower levels for milling purposes. The quality of this ore, as can be seen at the dumps, is of such a grade as to justify all the wear and tear involved, and to warrant the stress put forth in some extra efforts. It was the pleasure and good fortune of the writer, through the courtesy of Mr. Lyman, superintendent of the Gould & Curry, as well as through the invitation of Mr. Patton, superintendent of the C. & C. and Virginia, to descend and explore one of these mines at its most interesting and productive levels. This was the C. & C. mine and the examination and inspection took place on the 1750 and 1650 foot levels below ground. We would remind all who may enjoy the pleasure of following our footsteps, that they will meet with an officer in charge, above ground, in the person of Mr. J. B. Shaw who blends all the choicer qualities of a gentleman with the genial refinement of a well posted scholar.

In the Explorations Below,

We had the guidance of the underground foreman, who has been with the work in this mine for over 20 years, and who, now, in his advancing age, can look back over his work, and realize that he has shuffled out, from these nether depths, more bullion into the public coffers, than most bankers have ever passed over the counter in silver dollars, in the same space of time. We trust that no anti bimetallics will take exception to our comparison; for we are now engaged mostly in discussing the production of silver. Whilst our noble-minded escort did not claim to possess all the varied accomplishments of the poet Virgil, whose sacred spirit so kindly conducted his friend Dante through the deep caverns and shades of hell, yet we venture the opinion, that his footsteps and meanderings were quite as well timed, and

measured, as that ancient and worthy bard. It was very pleasant to observe how freely and familiarly he "trod these ancient halls" (not alone, for the writer felt inclined to follow his wake very closely) and what an extensive and intimate knowledge he possessed of all the bearings and workings of this once magnificent bonanza. After landing on the 1750 level we passed on and through the various drifts that radiate from this portion of the mine until we came to a new shaft sunk some 80 feet in depth at the terminal point of one of them. From this shaft ore of a very fair quality was being removed, with an improving indication of something very much better. Our course from this prospect shaft lay through long and angular horizontal drifts that trended more directly toward the principal sphere of operations in the Con. Virginia. After penetrating some hundreds of feet in that direction, we were requested to halt and listen. Our ears were saluted with a regular succession of thuds that appeared to emanate from some remote region above us. The foreman stated that these sounds were caused in working a brace of diamond drills by air pressure, and that if agreeable we would ascend to the 1650-foot level, where they were operated, and also take some circuit around the shell of the great bonanza from which a principal portion of the ore now extracted from this mine is taken. After ascending to the next level (1650) by an ingeniously contrived stairway set in the solid masonry of the mountains, we soon found ourselves in the presence of the drill-masters, who were engaged in

Cutting a New Drift

To the Con. Virginia. In passing around and through these drifts that encompass the base of the old bonanza, we had occasion to observe that some of the timbers, although thickly placed both vertically and horizontally to resist the tremendous pressure from the down-giving weight of material above, were snapped asunder in the middle, others crushed in at the ends, and the whole sides, at times, careened over eight or ten inches out of perpendicular for some distance. These massive timbers were 12 and 14 inches in diameter and barely 6 feet in length. To obtain such an exhibit of stress and strength of material one would have to descend about 2000 feet, as in this instance, beneath a mountain.

We should have but one solitary objection to these drifts and that we fear, in time, would increase in strength, provided we were appointed daily patroler to take in the circuit, and to learn how they were getting along. Our nerves are not the most shaky, but we should enter a stout protest against being provided with a sepulchre 2000 feet under the earth, even though 1,000,000 bonanzas, were piled up as a monument over us. However we should speak well of the bridge that carries us safely over. And as our guide took it all in as a matter of course, so did we. He stated that repairs were constantly going on among these timbers, old broken ones being taken out and larger, new ones being replaced.

Indeed, abundant proof of his statement could be seen in piles of mashed, broken and splintered timbers, at nearly every angle and turn of each drift, all gathered and heaped ready for removal.

In the various horizontal drifts that we traversed around this mountain of timber, that fills up the vast cavity out of which the old bonanza ore was taken, we met with numerous parties of miners engaged in taking out ore for the mills. These were mostly at work cutting into the external rim of the old bonanza, and taking out, in most instances, some of the richest silver ore that it has been our pleasure to see for many a day. Indeed, so hurried and forced was the ore formerly taken by millions from this C. & C. bonanza that there is no certainty in stating what yet remains in this recklessly butchered mineral wealth. We have some samples, now before us, taken from 1650 level, as we passed among the scores of miners, that are exceeding rich. And there appears to anyone taking in the prospect and review below, untold millions of bullion still ungathered in this mine. We came up feeling ourselves stronger, better and somewhat wiser, we trust, for having gone down. We enjoy looking at cabinets of precious ore. Here is one that will make the eyes of the old professor in mineralogy shed tears of gratitude and thanksgiving at the sight thereof.

An ejectment suit has been begun in the Superior Court of Nevada county, entitled Francis Hunt vs. Frank Seates et al.—five miners who are working a hydraulic mine on the premises of Hunt, twelve miles east of Wheatland. The mine is located on the ranch of Mr. Hunt, and is worked by the hydraulic process. The land was purchased from the railroad company by Hunt, the patent of which contains a mineral reservation, under which the miners claim a right to prosecute mining. This case will test the validity of that right. The mine is a small one, and can only be worked in the winter time when the water is plenty.

THE MINING AND SCIENTIFIC PRESS, Dewey & Co., Publishers, San Francisco, has lately entered its fifty-second volume. It is standard authority on all mining interests, and should, as it does, receive the encouragement and support of our miners. The price of subscription per year is low to suit the times—\$3, when paid in advance. Now is the time to subscribe for the New Year to secure the premiums.—*Mountain Messenger* (Downieville).

Mineral Lodes.

A Very Important Mining Decision.

The famous Tintic mining case, in Utah, which has been on trial many weeks, was decided by Judge Powers, in January. The case was entitled, "The Bullion, Beck and Champion Mining Company vs. the Eureka Hill Mining Company." A great amount of expert testimony was taken and the decision is one which all miners will be interested to read. The opinion of the court was as follows:

This case is one of vast importance. The amount in controversy, the lengthy trial, extending over a period of 13 weeks, the questions of law raised by the record, the learning and reputation of many of the witnesses, as well as the standing of the counsel employed, give sufficient foundation for this statement. While it has imposed upon the court careful and continuous study, and while the court is keenly alive to the great responsibility attending its decision, there have been many interesting features. The court has been permitted to explore the mysteries of nature. The testimony of the eminent scientists, all possessing a national reputation, and many with world wide fame, has been clothed in the most beautiful language and marked by a commendable spirit of fairness. They have "turned the granite leaves of the mountains" and explained how nature built her treasure vaults and placed therein the precious metals. It would be quite impossible to name in detail all these gentlemen, and quite invidious to single out any for special mention. It is sufficient to say, that the court was enlightened and charmed by such men as Hunt, Blake, Keyes, Diggett, Jenny, Clayton, Van Deusen and Palmer, men whose names are well known in the scientific world.

In these preliminary remarks, the court can do no better than adopt as its own the words of that most eminent jurist, Judge Field, in the Eureka-Richmond case, fourth Sawyer, 302, wherein he says: "Whatever could inform, instruct or enlighten the court has been presented;

Practical Miners Have Given

Their testimony as to the location and working of the mine; men of science have explained how it was probable that nature, in her processes, deposited the mineral where it is found. Models of glass have made the hill where the mining ground lies transparent, so that the court has been able to trace the course of the vein and see the chambers of ore found in its depths," to which, I may be permitted to add, that skillful draughtsmen, with beautiful maps, contributed their share. Assayers have tested the rock, and caused their mute tongues to speak. Photographers have, with admirable skill, reproduced the landscape, and specimens of ore and rock, almost innumerable, have been produced for the court's inspection. The court made an extensive visit to the mines in controversy, and examined the various workings and ore bodies, receiving the most generous attention from the litigants on each side.

In order to properly understand the case, it is well to refer to some of the salient features of the pleadings and proofs. The record shows that on January 6, 1885, the plaintiff filed its complaint in trespass, in which it alleged title to Bullion mining claim No. 76, in the Tintic mining district, Utah, stating that there is a lode of rock in place in said claim bearing silver and other valuable minerals, which has its apex wholly within the surface lines thereof; that the defendant, the Eureka Hill Mining Company, had trespassed upon said ore bodies and "are now working within said premises of the plaintiff beneath the surface," and threaten to continue said work and are doing great and irreparable injury.

The defendant answered fully the allegations of the complaint, and for cross complaint alleged its ownership of the Eureka claim No. 39, and of a lode of mineral therein, the course, strike and apex of which are in said mining claim, and between the side lines thereof, and parallel to said side lines. It is alleged that said lode is "very wide and dips westerly, and by a

Variation of the Hanging Wall

At one point, and for a short distance, the said wall and a small and comparatively unimportant part of the width of the lode is westerly of and outside of the westerly surface side lines of the Eureka mining claim, and within the Bullion. It likewise stated that the main part of the vein in its width is in and has its apex in the Eureka. That the Eureka is the older claim, and with the lode therein for its entire length was located and appropriated before the location of the Bullion, and that the same has been patented. That the plaintiff has for more than one year been in the possession and claiming to own the Bullion mining claim, and has set up and made, and still asserts an adverse claim to about 700 feet of the northerly end of said Eureka lode, claiming that it belongs to the Bullion. That it has sunk a shaft on the Bullion surface ground into the Eureka lode and is, and has been, extracting ore therefrom. That it continues by this action and otherwise to assert its adverse claim. The cross-complaint prays that the principal action be dismissed, and that the title of the Eureka to the lode in question be quieted.

The plaintiff answering the cross-complaints denied all the principal allegations thereof.

(Concluded on Page 99.)

MECHANICAL PROGRESS.

Cheap Machinery.

We take the following sensible remarks from the *Mechanical World*. They are applicable to any manufacturing country:

"One of the reasons why much of our trade has left us is cheapness. English engineers can turn out better work than the engineers of any other nation, if they choose to do so, but the competition which has grown up, during the last few years particularly, has been so severe that a very large, and we are afraid an increasing number of firms have, in the struggle to make ends meet at low prices, gradually let down the character of their productions until they can no longer be classed even as of medium quality. Manufacturers never make a greater error than when they sacrifice quality, and in severe competition should cease to seek orders which will not pay unless quality be sacrificed, for it is almost axiomatic that a firm's character is ruled not by their best, but by their worst quality of work, so that if once a manufacturer stoops to low qualities of work, he is doomed to remain there.

"As a proof of this, it is not a fact to-day that our busiest firms are those noted for invariably good quality? and are not the low quality men all struggling together in the rush for the poorer class of work? We have known many instances of individual firms who for long were known as one-quality men, and yet who, perhaps, in the push of bad times, have been tempted to take cheap orders. This has been their downfall. The cheap orders have demoralized the men, and the low tone, once entering is difficult to eradicate, and workmen say to each other, 'Oh! this will do; it's only for such and such an order'; and the result often is that, even with all its cheapness, the article turned out does not even secure as good a quality as its price warranted. Perhaps, if it had been finished no worse than its price, it would have given satisfaction, but it has not been so finished; it has been robbed of its poor birth-right, and being, perhaps, sent abroad, it has to compete with the work of the foreigner. Now, the foreigner is just at present putting forth his best efforts to compete with our poor efforts, and, of course, comes off the victor. If English engineers are to hold their own, they must simply do as they used to do, and make the words English and good synonymous terms. We are not here finding fault with cheapness, *per se*, for we all know that it is less expensive to build an engine now than it was formerly. We speak now more especially of what may be termed wholesale work, which is reproduced in hundreds. In this class, modern machinery has cheapened production in many ways, and the final price of the manufactured article may legitimately be correspondingly reduced.

"Economically, also, it is wrong to employ labor in producing had articles, for to put 20s. worth of labor upon the same value of raw material, to result in a 40s. article, is less economical than putting the same labor upon raw material of the value of 30s., for which perhaps 60s. will be finally obtained. It is often said that the wages of foreign nations being less, they are better able to produce cheaply than ourselves. This is, perhaps, true; but it is a fact daily becoming less burdensome to us, for with the spread of knowledge upon the European continent, workmen are becoming more alive to their true position, and shorter hours, with higher wages, cannot long be withheld. It is surprising that such is not even now a more burning question. Even in America, where it might be supposed a knowledge would have, ere this, spread of the short hours of work in this country, we find twelve hours a day to be the rule. We are not amongst those who think that a return to longer hours will be seen. The tendency of the day is to short hours, and if the world's production goes on increasing as it has done of late, the greatest question will soon be, 'What is to be done with our production?' Not, 'How much can we produce?'"

The Use of Steam Jackets.

It is surprising, says the *American Engineer*, to note how frequently one meets engineers, especially those in practical charge of engines, who have an idea that the function of the steam jacket is to prevent radiation of heat from the cylinder to the atmosphere, and regard its purpose in the same light as they do that of felting and lagging. But this not uncommon fallacy of considering it as a non-conducting device instead of as a supply of heat for the entering and expanding steam, is worthy of special mention. We know of a naval engineer in Government service, who, much to the discomfort of his assistants, insisted on having the highest attainable temperature in the engine room, closing up all doors, and windows, his directions being reinforced by the explanation: "What's the use of a steam jacket to prevent the radiation of heat from the cylinder, if the temperature of the room is not in the eighties or nineties?"

And this view is cropping out constantly, in many other ways, as when exhaust steam, or steam of a pressure much reduced below that corresponding to the initial pressure of steam, is let into the jackets. If a steam jacket is to be of any practical use, the temperature of the steam it contains must at least equal that of

the steam entering the cylinder. A queer and expensive kind of non-conducting device, indeed, in which the radiating surface is increased beyond that of the cylinder itself, and in which steam specially drawn from the boiler is the means.

Another writer on the use of the steam-jacket says: When you jacket with live steam you have a larger area for the condensation of steam than with the naked cylinder; but it is of less injury to condense live jacket steam than to condense cylinder steam, and it is less loss to condense exhaust steam in the jacket than to condense live steam in the cylinder. Of course the jacket must be properly formed. There should be an air space between the exhaust jacket and cylinder; and there should not be a current of exhaust steam passing through the exhaust jacket.

American Locks—Threatened Competition.

Hitherto American locks have met with a very large sale in England. The Pittsburgh lock manufacturers were especially held in favor by the London Government and other contractors, but the English lock-makers have recently determined to make a strong effort to secure that trade for themselves, and even to compete for the market in Canada, Australia, China and elsewhere, which has been generally supplied with American locks.

It appears that Messrs. Carpenter & Tildesley, a lock-making firm of Willenhall, near Manchester, have made up their minds to make the experiment at least. They have studied principles, construction and mode of manufacture of the Pittsburgh manufactures, have set aside \$50,000 to win or lose, as the case may be, and while they do not propose to imitate the exact designs of the Pittsburgh locks, they will come very close to them, and propose to put their goods on the market at a reduction of 30 per cent below the American.

How the Cheap Production will be Effectuated.

The English correspondent of the *American Manufacturer*, from whose letter we collate the above, continues as follows: A hint may be gained of how the cheap production will be accomplished when I state that in the manufacture of their wrought-iron rim locks the firm employ girl labor very largely. Two-thirds of the work in every lock is the outcome of girl labor. Their opponents, some of whom are gradually losing their Australian connection in consequence of the machine competition, are making the most in their own interests of the employment of girls by the firm, and are converting it into a "cry" against them.

Female Labor in the English Lock Trade.

But in fairness to the firm I must state that they assure me that in reality the advantage which they gain by the employment of females is not of much importance. They are, they say, paying as good wages as they would pay to young men, and they challenge comparison upon this point of their books with the books of their opponents. Of course female labor cannot be employed to do the casting which will be requisite for the entry into the American business, but it can be for the interiors, and if there is anything in it as compared with the cost of men's labor, that is one advantage which your Willenhall competitors will enjoy.

A STEAM PRESSURE REGULATOR.—An automatic regulator of the steam pressure within a boiler has been patented by J. Q. Everson, of Pittsburgh, Pa. A pipe is attached to the safety-valve, and, passing through the stack, enters the flues of the boiler. The pipe should be as large in diameter as the opening in the safety-valve, so that the escape of steam will not be retarded. When the steam pressure exceeds the safety limit it raises the safety-valve and escapes through the pipe into the flues. Thus the steam not only reverses the draft, but forces the gases that are non-supporters of combustion back into the fire. In this way the fire is cooled, the temperature is lowered and the pressure is reduced below the safety limit. The safety-valve then closes, the fire again burns and the hot gases are drawn through the flues into the stack. By the use of this invention an automatic regulation of steam pressure is therefore secured by utilizing the waste steam escaping from the safety-valve. A thorough test of the new appliance has been made at the Pennsylvania Ironworks, Pittsburgh, where for some six months past it has been in operation on a battery of eleven steam boilers with unvarying success. The device is stated to be as inexpensive as it is simple, for whilst performing its preventive functions, it also thoroughly cleans the flues and saves fuel.

IMPROVED BESSEMER STEEL.—A recent improvement in the Bessemer steel process as carried out at the Edgar Thomson Steel Works, near Pittsburgh, will have the effect it is said, of making Bessemer steel equal in quality to the crucible product, and at only about one-tenth the price. The change consists in a thorough mixing of the spiegeleisen with the molten iron in a ladle, and in such a manner as to make the carbonization much more uniform than at present. Bessemer steel can be produced at a cost of a cent to a cent and a half per pound, while that made in crucibles costs at least eleven cents a pound.

SCIENTIFIC PROGRESS.

Science in the Workshop.

Webster defines science as "knowledge, penetrating and comprehensive information, skill, expertness," and the like. Where, says the *Chicago Industrial World*, is there greater occasion for the acquirement of such comprehensive information in relation to the duties of every day work than in the shop? Here men deal with physical and mental questions. From wood and iron and steel they evolve forms which are the duplicate of previous mental conceptions. The angle or curve so beautifully fashioned in wood or metal is a reproduction from the mind. Yet there are those who contend that no previous mental training is necessary to make the good workman, or, if not going quite so far as this, contend that no previous orderly and systematic course of information is necessary to fit the workman for performing his duties in the most efficient manner. The whys and the wherefores of an art or trade are matters which some artisans disdain to look into. All they care for is to procure a certain effect. If the steel they are working can be bent and fashioned into shape under certain conditions of heat and pressure, that is all they care to know about the subject. How that steel acts under trial, why it will work to advantage when heated to one color, and will not when heated to another color, is a matter of seemingly useless speculation to workmen who think that practice is all that is necessary in the prosecution of their trade or occupation.

It is self-evident that the man who knows how a given metal will act under a thousand conditions, has superior acquirements to the one who only knows how it will act under a hundred conditions. Better still is the man who only knows why and how these various conditions arise. Frequently difficulties spring up in the shop when some material is under treatment or manipulation, which baffle the skill of the workmen, but which are easily overcome by means which some one familiar with the action of such material under such circumstances may suggest. The skill of the latter person is greater than that of the former, because he has more "penetrating and comprehensive information" touching the subject in hand, than the former.

Will anyone contend that the expertness, the "penetrating and comprehensive information" is of no avail in the shop? Young men, young engineers, young mechanics should by all means be taught to respect scientific methods of thought and labor. They should remember that there is an orderly, systematic way of arriving at conclusions, and a slipshod haphazard way. The workman may accomplish a certain effect and yet be ignorant of the real causes which lead up to the results obtained. He may strive for a similar effect again, and fail because of such ignorance. Knowing causes which produce effects, one can often calculate the results which a modification or change in such causes will produce. Science means thoroughness—exactitude. It means the understanding of one's work and not a blind groping after effects. It means the establishment of business upon correct principles—upon truths. What firmer foundation can there be than that which rests upon ascertained scientific principles? Such a foundation is everlasting—is impregnable.

Much of the opposition to scientific study in relation to shop practice arises from a lack of mental discipline. Men unaccustomed to study who cannot reason from cause to effect, who cannot arrive at a just conclusion from a given premise, cannot be supposed to be very enthusiastic over scientific studies. It is the old fight of ignorance against knowledge. But in the long ages to come knowledge will conquer ignorance and the light against science, research and study will give place to broader views and better methods.

DISCOVERY OF AN ANCIENT FRENCH FORT NEAR BOSTON.—The recent discovery of an ancient French fort on the Charles river leads Prof. Horsford to locate Norumbega, which has been a mythical place in New England history, at Salem. His researches have reached two important historical discoveries; first, the site of the landfall of John Cabot, in 1497; second, the site of the fort of Norumbega of the French, on the banks of the river bearing the same name. The results of his investigations in this direction are fully given in bulletin 2, of the American Geographical Society, just published. The site of the old French fort is in the immediate vicinity of Boston, being in the town of Weston, at the point where Stony Brook empties into Charles river. This research has, of course, involved years of geographical, historical and philological labor and study, and some of his gleanings have been from manuscript and map collections in the great public library at Paris. Professor Horsford holds out that Norumbega was a name which John Cabot brought back with him and did not know, but found out that Norumbega means "divided bay," or "divider of the bay," according as it is applied to land and water. It would apply to Salem neck; and all descriptions, maps, etc., pointing to this place as the landfall of John Cabot.

This discovery is a most interesting one, from the fact that if the above surmises are correct, Salem, Mass., must have been the first point on the American continent touched by Europeans, Columbus having reached nothing but islands

until after that time. Professor Horsford's careful researches in Algonquin history give him great advantages in his line. Old, mellow Salem may now put up a monument to John Cabot.

Measuring Sunshine.

Nearly fifty years ago, a plan was presented to the Cornwall Royal Polytechnic society of England for registering sunshine, continuously throughout the day. But nothing practical came of it until 1853. After various modifications, the idea was successfully carried out by means of an instrument, termed a heliostat, invented by Mr. J. F. Campbell, of Islay, by which the sun's rays, whatever be his altitude, were always reflected along the same direction throughout the day. This entailed the employment of clockwork to drive the reflecting mirror, and a similar power was also required to move the paper past the slit through which the sun's rays were admitted.

Mr. Campbell hit on the very ingenious notion of employing a glass sphere as a lens, so that as the sun traveled round the ball its image should travel round on the opposite side. The first instrument consisted of a ball placed inside of a mahogany bowl, turned to the exact focal length of the ball. Such a bowl was capable of receiving a record for six months from one solstice to the next. It was, however, impossible to distinguish the record of consecutive days from each other, and accordingly a plan had to be devised by which the record could be obtained on a slip of card hoard or other material which could be replaced daily.

A very ingenious frame was finally devised by Prof. Stokes, of Cambridge, provided with grooves into which the cards are slipped. The grooves are in three pairs—for the summer, the winter and the equinoxes respectively, and the cards have hour lines printed on them. The instrument can thus be used as a sun dial, for the spot where the solar image appears—where the burning is taking place—of course corresponds to the spot where the shadow of the gnomon would cut the scale of the dial. These instruments were first brought out at the end of 1879, and there are now nearly 50 of them in various parts of the United Kingdom.

CAN A HUMAN BEING BECOME PETRIFIED?—A medical journal, in an article on petrification of the human body says: "Petrification of the body of a warm-blooded animal never has been known, and it is quite safe to say, never has taken place. The condition of the body which leads to such a misconception is not that of petrification, but of saponification. It is explained that nitrogenous tissues give off ammonia, and this attacking the fats of the body produces adipocere, a hard form of soap. A gentleman at the New Orleans fair saw a barrel of pork labeled, 'Found floating in the Mississippi river in an advanced state of petrification.' Being skeptical as to the capacity of rocks to float, he chipped off a piece and found that the hog, like the human being under like circumstances, had merely turned to adipocere.

A SCIENTIFIC DISCOVERY.—Scientific investigators have found that the power of the bacillus of consumption is destroyed when other bacteria are grown in the same soil. Recognizing this fact, the new and remarkable idea has occurred to Dr. Cantani, of Naples, of fighting bacilli with other bacilli. If one of the organs of the body be attacked by a bacillus which is dangerous to human life, he introduces a bacillus which is not dangerous to man, but brings destruction to the dangerous bacillus. In the case of a consumptive patient, the doctor introduced a harmless organism known as the bacterium termo, and found that the bacillus tuberculosis gradually disappeared from the patient's expectorations.

AN OPEN POLAR SEA.—Lieut. Greely believes in the theory, and asserts the same in his lectures in England, that there is an open sea some 1500 miles in diameter round about the Pole that never freezes, and conjectures that the Pole itself is the center of an ice-capped land, covered with ice from 1000 to 4000 feet thick. These conclusions are rejected by prominent Arctic authorities in England.

MELTED STEEL UNDER THE MICROSCOPE.—Melted steel under the microscope shows a kind of cellular tissue, the iron forming the nucleus and the carbon the envelope of the cellules. These cellules form agglomerations known as compound cells, which are identified with what is known as the grain of the steel. Their surfaces are in the region of least cohesion.

MOONLIGHT AND SUNLIGHT.—"Among women especially," says a French writer, "it is regarded as a well-known fact that moonlight is not only more injurious than sunlight to the complexion, but that silk and woolen materials are faded more rapidly by the moon's rays than by the brightest sunlight."

THE HEAT OF THE SUN.—In the focus of a burning glass, the sun's rays will melt the most refractory substances. The heat, then, of the sun is most intense. If we were as near to the sun as we are to the moon, the whole solid earth would melt away as wax.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, Feb. 6, 1886.

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Passing Events.

The recent storms caused a number of serious and fatal accidents in the mountain regions of Idaho, Colorado and Utah. Several miners have lost their lives by snow-slides.

Several new gold mining districts have lately been organized. The Fresno district is in the county of the same name; Solo and Arrow districts are both in San Bernardino county. Arrow district is the new gold mining region about which there is some little excitement.

The stormy weather so long prevailing seems over, and just now we are rejoicing in bright sunshine in these latitudes.

There is quite a revival of gold quartz mining now prevailing, and the signs of the times are that many old mines will be reopened in this State, and many prospects developed this year.

The Sierra Buttes mine has been in operation for 34 years, and the owners are carrying on their explorations as though they expected the ore would hold out for another 34 years. A 60-stamp mill is kept in operation, and 250 men are constantly employed.

The Monitor mine and mill at Taylor, White Pine county, has been sold to the Eberhardt Company, the English capitalists who have operated largely in Hamilton for the past sixteen years.

An arrangement has been made by the Peer, Peerless, Crocker and Weldon Mining companies of Quijótoa, Arizona, to explore grounds by means of a tunnel instead of further individual sinking.

Fine Gold.

At Placerita, near Newhall, Los Angeles county, eleven miners are at work taking out \$6 per day. The Los Angeles Times says it is found that the gold is the first ever discovered in California, running \$19.75 to the ounce. An ounce of pure gold is worth \$20.6718. We give an instance in another column of this paper of gold from Tuolumne county bringing \$19.49 at the mint.

Our contemporary is in error, however, as to the Los Angeles gold referred to being the finest ever found in this State. Near Sonoma, Tuolumne county, there is considerable very fine gold. The gold from the San Guiseppe mine has been found to be worth \$20.32 per ounce; that from the Neale is worth \$19.64. This is, moreover, quartz, not placer gold. We gave the particulars in the PRESS of Dec. 5, 1885. Gold of 956 fineness is worth \$19.76 per ounce, and all the gold mentioned in this appended table over this 956 is worth more than the Los Angeles gold referred to.

In this connection it will be of interest to note the fineness of gold of this State from different localities, compiled from notes by John S. Hittell. The following shows fineness of placer gold:

Springfield Flat, Amador Co.....	965
Yankee Flat, Butte Co.....	960
Coon Hollow, Eldorado Co.....	970
Smith Flat " " " " " " " " " "	978
Spanish Hill " " " " " " " " " "	987
Sugar Loaf " " " " " " " " " "	963
White Rock Hill " " " " " " " " " "	965
Alpha, Nevada Co.....	968
Chalk Bluff " " " " " " " " " "	976
Deer Creek " " " " " " " " " "	956
Gold Hill " " " " " " " " " "	970
Omaha " " " " " " " " " "	975
North San Juan, Nevada Co.....	960
Timbuctoo " " " " " " " " " "	950
Blue Lead, Placer Co.....	944
Cedar " " " " " " " " " "	965
Dutch Flat " " " " " " " " " "	975
Michigan Bluff " " " " " " " " " "	970
Michigan Flat " " " " " " " " " "	970
Squire's Canyon " " " " " " " " " "	965
La Porte, Plumas Co.....	945
America Hill, Sierra Co.....	950
Bald Mountain " " " " " " " " " "	950
Gibsonville, Plumas Co.....	936
Nebraska " " " " " " " " " "	935
Pine Grove " " " " " " " " " "	920
St. Louis " " " " " " " " " "	925
Columbia, Tuolumne Co.....	950
Shaw's Flat " " " " " " " " " "	930
Springfield " " " " " " " " " "	960
Sugar pine " " " " " " " " " "	920

All the above figures relate to placer gold. Of quartz gold the following examples of fineness are given:

Plymouth, Amador Co.....	840
Night, Butte Co.....	890
Angels, Calaveras Co.....	900
Bovee " " " " " " " " " "	908
Flanigan " " " " " " " " " "	910
Morgan " " " " " " " " " "	910
Clipper Hill, El Dorado Co.....	900
Josephine Lode, Mariposa Co.....	918
Allison Ranch, Nevada Co.....	806
Gold Hill " " " " " " " " " "	875
Nevada " " " " " " " " " "	830
Union Hill " " " " " " " " " "	822
Washington " " " " " " " " " "	860
American Bar, Placer Co.....	860
Ironside, Sierra Co.....	900
Keystone " " " " " " " " " "	933
Rough-and-Ready, Sierra Co.....	900
Table Mountain, Tuolumne Co.....	950
Bald Mountain " " " " " " " " " "	950
Dannenberg, Yuba Co.....	900

In this connection a paragraph from the report of the State mineralogist will be of interest: "One grain of pure gold is worth \$0.0430963; one gram pure gold is worth \$0.6646+; one ounce troy of gold is worth \$20.671,791; one pound avoirdupois gold is worth \$301.46+; one ton (2000 lbs.=29,166.6 oz. troy), \$602,927.36; one cubic inch (10.12883 oz. troy), \$209.38; one cubic foot (17,597.9808+ oz. troy), 1205.4898 pounds avoirdupois; value \$363,409.85. The standard fineness United States gold coin =900; one cubic inch of standard gold, 9.0989 ozs.= \$169.25; one cubic foot standard gold = \$292,500.00. The average specific gravity of California gold dust, as it would be in a box or bag was found by the United States mint to be 9.01. It occupies about twice as much space as when melted into bars. A rectangular box, eight by ten inches, and five inches deep, will contain \$36,000 in gold coin laid in order, and \$27,000 poured in and shaken. A bag six inches by nine inches will hold \$5000 in gold coin with room to tie.

COLORADO is credited with a bullion product for 1885 of \$22,800,000, of which \$13,000,000 was silver, \$5,000,000 gold, \$4,000,000 lead, and 500,000 copper. As we have before stated, this shows that Colorado has her lead and copper credited to her, while California is not credited with these or with quicksilver borax, or any of her numerous mineral products. Of gold and silver Colorado only leads California by about three millions, California leading in gold. Of the total of Colorado product, Lake county (which includes the Leadville district) contributed \$12,357,662. This is about \$500,000

less than in 1885. The gold value of this Leadville product has been steadily falling off since 1880, yet it is stated that the quantity of silver produced in 1885 was 1,235,642 ounces greater than in 1884.

Roscoelite.

We have been shown some very rich and fine specimens of Roscoelite from the Stuckslager mine, Lotus, El Dorado county. The mine is a peculiar one in many respects. Although discovered ten or twelve years ago, it is but lately it was re-opened, and pay found again. At the time the mine was discovered, the mineral found was new to science, and was named Roscoelite, of which we have spoken more fully in recent numbers of the PRESS. This mine is, with one exception, the only place where the mineral has been found.

There is a quartz ledge or reef, in which the seam of Roscoelite is found. This seam runs from an inch in width down to a "knife blade." This seam, where wide, is very rich in gold, the gold being from 900 to 950 fine.

The gold is found all through the Roscoelite, though there is none to speak of in the quartz itself. None of the quartz is worked except that which lays next to the seam of greenish mineral, and that is ground in an arastra. This quartz is from two to six inches wide in the main vein. Sometimes there are several layers of quartz. The seam of Roscoelite sometimes pinches down very small, and then widens out into pockets, and these pockets are very rich. Sometimes quarter or half the weight is of gold. At a depth of 30 feet a \$11,000 pocket was found, and altogether \$80,000 or \$100,000 has been taken out of the mine.

They are now down 150 feet from the original surface, and are drifting and stoping. There is a tunnel connecting with the shaft by which waste is run out. At the deepest point they have taken out the richest of the seam, but they have not come to water level yet. The formation is now just the same as it was on top, when they got the rich pay in the early days of the mine.

The claim belongs to Messrs. McKenney and Woods. The claim is only about two miles from Coloma, where the discovery of gold by Marshall occurred. The Roscoelite is greenish black in color, has a greasy feeling, is soft, and crushes very easily in a mortar. The gold in it is free and in good-sized pieces. More or less of the gold-bearing mineral is sold for specimens. There is a mine of a similar nature about two miles from this one, which will shortly be worked.

Telluride Ores.

We were shown a few days since some beautiful specimens of telluride of gold, some of it in an apparently crystalline form. It was from the old Belmont mine, discovered by Patterson and Turner, as long ago as 1857. The mine is on Bald mountain, near Sonora, Tuolumne county, and belongs to Mr. W. E. Garrett. The gold is of the finest quality and brings \$19.49 per ounce at the mint. The ores are very rich indeed, since the white tellurium is abundant in them. From one piece of ore weighing seven pounds Mr. Garrett obtained 36½ ounces of gold, the gold being sold for \$19 per ounce at Columbia.

The mines are being worked by the owner. The richest of the selected ore is pounded up in hand mortars, and what is not treated in this way is worked in an arastra. They have been throwing away a good deal of the "white stuff" for a year or more, not knowing its value, and the owner, now that he has discovered that it is petzite, values the dump at many thousands of dollars. One piece, which he remembers throwing away, he now knows is worth over \$500. The dump will now be picked over again for the "white stuff." The large specimens brought here and sold were very fine, from half to three-quarters of the quantity being gold. The ore is all carefully sorted as it comes from the mine. Lately very rich rock has been taken out.

KERN COUNTY MINES.—The Sumner mines, Kernville, Kern county, Cal., are being purchased by an English company, who propose furnishing an abundance of working capital, and opening up the property on a large scale. The mines are already furnished with efficient machinery and a splendid water-power. In a few months, a great deal of mining activity may be looked for in this section of the country.

Academy of Sciences.

Professor Davidson presided at the meeting of the California Academy of Sciences on Monday evening last. Donations reported since the last meeting were: Several specimens fossil marine shells from Lewis creek, about 1200 feet above the sea level, and some scaly lizards, donated by Captain James S. Lawson; scorpions by Captain William Patterson, and a little snake called *aneila pulchra*. An interesting paper on the fauna and flora of the Yukon river, by Dr. Willis E. Everette, U. S. A., of Vancouver, W. T., was read. Dr. Everette described some of the heasts that roam through the forests and over mountains and moor in that far north country. Conspicuous among these are: A bear which occupies a place between the grizzly and polar bears, and is carnivorous, resorting to roots for subsistence only when driven to it by extremity, and which he named the Alaskan bear; the Alaskan moose and cariboo, which are much heavier than their Canadian cousins or the moose of Maine, and a deer something like our California deer. The Alaskan bear preys largely upon the moose, destroying whole droves of them when the snow crust, which remains intact under the shuffling and sliding gait of the flat-footed bear, is cut through by the sharp hoofs of the moose, making its retreat so slow and difficult that it falls an easy prey to its shaggy foe. The doctor described some beautiful song birds, and a number of game fowl of the grouse species, while the lakes are covered with myriads of wild geese, loon and other water-fowl. There is also a huzzard, which reminded him of the great California vulture. Of fish, the varieties of salmon and trout predominates. He saw no musk-ox, as they seek the more level regions toward the Mackenzie river.

Professor Davidson read some notes of observation on the planet Saturn, and a description of the locality in Volcano Canyon where the stone pestle exhibited at a meeting of the academy about a month ago, was found far below the natural surface of the ground.

Dr. Harkness pointed out some errors in classification made by Dr. Everette in his paper.

Professor Davidson read a report of appointments made by the council for the ensuing year as follows:

Publication committee—George Davidson, J. T. Evans, J. P. Moore, Charles G. Yale, Edward Lee Greene.

Curators—Botany, E. L. Greene and Mary K. Curran; entomology, E. S. Clark; conchology, Josiah Keep; mineralogy, A. W. Jackson and C. D. Gibbs; geology, Melville Attwood; ethnology and paleontology, Dr. A. B. Stout; ichthyology, Miss Rosa Smith; crustacea, radiates and reptiles, J. J. Rivers; ornithology, E. F. Lorquin.

The New Gold Camp.

In our "mining summary" this week further mention is made of the new Arrow mining district, San Bernardino county. Heretofore reports have been more or less vague, but if recent news is to be believed, they have a prospect of developing a good camp there. Mr. Daniel Edwards, foreman of the King mine, of Calico, who has recently visited the camp, reports the country as justifying the description of its prospects, as already given in the *Print*, and copied by us in the *PRESS*. The big ledge, which, though not so rich as the smaller ones, is considered the mainstay of the camp, can be traced a distance of four miles, and shows gold all along the entire distance. Huge blow-outs occur at intervals from the croppings of which assays of \$600 have been obtained. Every foot of the big lead is located, and scarcely any work of development has yet been done on it owing to the fact that the pioneers of the place spent their time in locating new ground in preference to exploring what they already possessed. The small ledges, which are in great numbers, are said to be very rich. Ten tons shipped from one of them realized \$1000. Wood is plentiful on the mountains near by. Water is plentiful within three or four miles of the camp, to which it is transported by the burro train. The only drawback to the speedy development and proof of the camp is, the lack of facilities for economically working the ore. At present it must be hauled at a cost of \$20 per ton to the railroad and shipped thence 80 or 100 miles before it reaches a mill. Consequently \$80 or \$100 ore is of the lowest grade that can possibly be handled.

The Grittinger Ore Roaster.

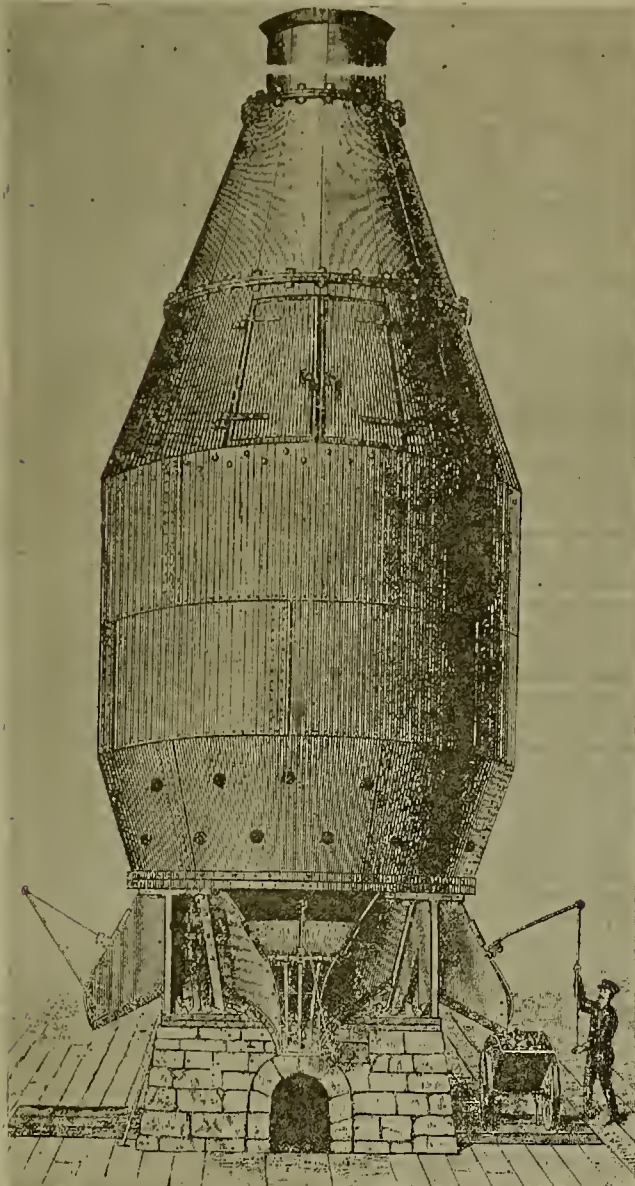
In concluding the short series of illustrations of ore-roasting furnaces such as are used in iron-producing regions, we give engravings of the Grittinger ore kiln. One of the figures is an elevation showing the roaster surmounted by a cast-iron hood and chimney, the chimney being shown as cut off so as not to take too much space on the page. The method of discharging the kiln is also exhibited. The other views show a vertical section of the roaster without a hood, and a top view looking down upon the central star-shaped cone, a portion of the shell and lining of the kiln being removed so as to show one of the chutes.

It is not necessary that the hood and chimneys be added, but where sulphurous ores are

except to raise the pivoted gate when filling a charging-barrow. Should there be any sign of unequal roasting, bars can be inserted in the openings in the shell, which also supply air for combustion to the outer portion.

There are 20 of these roasting kilns in use at Bird Coleman's furnaces, and six at North Cornwall furnace, Cornwall, Lebanon county, Pa.

A kiln 15 feet in diameter and of the proportions shown in the plate, will hold about 125 tons of ore, and will roast from 18 to 25 tons per day, dependent upon the amount of fine ore. The kiln is not claimed to have a complete desulphurizer like the gas-roasting furnaces, but it is the result of extended practical experience, and the various improvements embodied in it are believed by Mr. Birkinbough, who describes it, to permit better results than any



GRITTINGER ORE-ROASTER.

treated they are very advantageous in carrying off the sulphur-fumes. By preference, the cones and chimneys are made of cast-iron, wrought-iron deteriorating too rapidly.

The peculiarity of these kilns is in the lower portion. A series of column-brackets support a mantel carrying the shell of the kiln, and to these brackets are secured the ore-chutes and inclined bottom plates. In the center of the kiln there is erected a cone, star-shaped in section, the points of the star shutting against the column brackets; the spaces between the points or ridges, forming chutes of constantly decreasing incline and dividing the area of the kiln into practical uniform sections, thus encouraging a regular division of the ore to the outside chutes. A large flue passes up within the star-shaped cone and supplies ample air for combustion in the center of the kiln, as shown by arrows in the vertical section.

By erecting a kiln on a masonry base and providing pivoted grates, controlled by levers, to the outside chutes, a minimum amount of labor is required to discharge the ore. The ore and fuel (the latter generally culm, slack or braize) are charged at the top in approximate layers, and ordinarily no additional labor is required,

other form of roaster in which the solid fuel is mixed with the ore, driving off all the sulphur, which can be expelled by the simple application of heat.

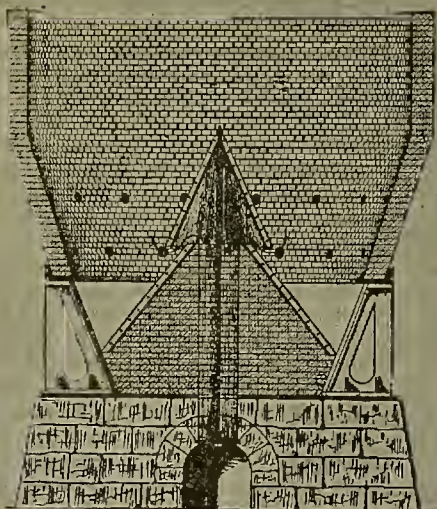
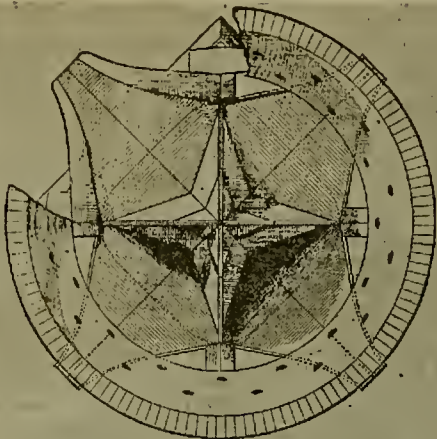
WE received in San Francisco last month 71,167 tons of coal, of which Puget Sound regions yielded 23,597 tons, Oregon 4,020 tons and British Columbia 17,593 tons. The remainder came from Australia and the British Isles. The Puget Sound coal came from the following mines: Carbon Hill, Cedar River, South Prairie, Seattle and Green River. In the same month last year we received 89,677 tons of coal.

THE MINING AND SCIENTIFIC PRESS of January 23d, is a most valuable edition containing a complete report of the mineral production of all the States and Territories. It contains a whole volume of information on mining topics; in fact, this journal, published in San Francisco, is one of the best journals of the kind published in the country. It is always a welcome visitor.—*Elk Mountain (Colo.) Pilot.*

MINERS from Secret canyon, says the Eureka Sentinel, are hopeful that the coming spring and summer will witness big ore shipments from that section. The Geddes & Bertrand mine is looking and yielding well.

New Steamships.

The Oceanic Steamship Company has decided to order a new 4000-ton steamship to run between this port and Australia. Mr. John D. Spreckels, president of the company, has gone East to see Cramp, of Philadelphia, who built the Alameda and Mariposa, but he will have to underbid other American builders to get it. It may be mentioned that the Union Iron Works of this city may get the contract. In speaking of the probability of the work being done on this coast, Claus Spreckels expressed a decided preference for spending the sum (roughly estimated at \$600,000) at the ship-yards of San Francisco. The managers of the Union Iron Works will have a field of equal competition for the contract with several points in their



SECTION AND PLAN OF ORE KILN.

favor, and if it is found that the work can be done successfully here, Eastern builders will not get the work.

It is to be hoped that the Union Iron Works will succeed in getting the contract. They have not had an opportunity to build a very large vessel since their ship building plant and new works were completed. What work they have done, however, has been very satisfactory. They have expended large sums of money to establish a first-class iron ship building plant on the coast, and stand ready to expend more.

California steamship companies, therefore ought to "strain a point" to have the work done at home, where the money will be spent among our own workmen. There are still some necessary additions to be made to the Union Iron Works plant, but they would be made immediately if occasion demands. They have skilled workmen in designing and constructing, and the work would be under the immediate supervision of the owners. It is sincerely to be hoped that this steamship will be built there so that our only large ship building plant, adapted for iron vessels will be thoroughly tested.

Mining Accidents.

Joseph Kendall has had both legs broken by a cave in the Consolidated Esmeralda mine, at Aurora, Nevada, on the 28th ult.

Wm. Walker, a miner, while inspecting the Lima Consolidated Mining Company's shaft property near the Emerald mine, Tombstone, Arizona, fell down a winze a distance of thirty feet, striking on his feet, and broke his left leg badly below the knee, and dislocated his right ankle. The bones of his left leg protruded through his overalls when he was rescued.

Paul Champion, a miner at the Young America mine, Sierra City, Sierra county, had his hand hurt last Saturday.

A snow slide occurred on Lake creek nine miles above Ketchum, Idaho, in which three men lost their lives by being buried in the snow. Their names are Frost, Burro and Poters. They were working on the Home-stake mine owned by J. O. Swift and Harry Frost of Ketchum. A man by the name of Warring was also caught in the slide and was buried in the snow, but he succeeded in getting out and giving the alarm. All four men were in the cabin, when Warring stepped outside the door for a moment. Before he could get inside the avalanche struck and buried them all. Warring could hear Frost groaning for six or seven hours after the slide struck, and after that time all became still.

Three men were killed by snow slides at the Excelsior mine, Colorado, last week.

Tom Loring is reported to be buried under sixteen feet of snow on Thompson creek, a tributary to Warm Springs creek and about fifteen miles from Ketchum, Idaho. About half an hour before the slide he went from the mine to his cabin, where, in all probability, he met his death.

A fatal snow slide occurred near the Crescent mine, Park City, Utah, last week. The men had left the mine with the ore teams, and did not arrive below at the proper time. Investigation showed that an avalanche had caught them shortly after leaving the mine. All the men at the Crescent and Apex mines went with picks, shovels and lanterns, and in half an hour 200 men were at work trying to save the unfortunates. The drivers of the teams were William Sessions and Alonzo Gallard, who had in company with them William Backus and Frank O'Hara, who had been up to the mine in search of work. Mr. J. C. Cleveland was also in one of the rear sleighs. The fearful avalanche struck and hurled them with the speed of lightning into the bottom of the gulch, some distance below, completely burying both men and teams. Mr. Cleveland was fortunate in being thrown against a tree to which he clung for dear life. Although completely covered, he was still in such a position that he was enabled, by almost superhuman strength, to work his way to the surface by the aid, which the assistance of Mr. Nichols, who had left his sleigh and hurried back, afforded him. He was the only survivor, and with the exception of a dislocated shoulder dressed by Dr. Le Compte, who was early on the scene, he walked down the canyon to his home. The other four men were dug out as speedily as possible, but all four men were dead when extricated. The most unaccountable circumstance of this event was the fact that not one of the eight horses attached to the sleighs were injured in the least. After being dug out and cut loose they all galloped down the canyon and reached their stables ahead of the rescuing party.

SENATOR STANFORD, in speaking of California mining interests, says: "The mining development of the State is still very large. The gold yield aggregates well. I have owned some mines, and in one of them we made a profit when we got \$4 of metal out of a ton of the quartz. Indeed, quartz mining is probably in better condition in California than it has been for a good while. The great interest of the new west, excepting California and Utah, is first the mines and next cattle. Now, in the State of California, we probably find more than 125,000 persons engaged in agriculture, and that is a larger proportion than anywhere west of the Rocky mountains, possibly excepting Utah. Hence the mining interest is an important one to be supported. This is why upon the silver question I am for the continued coinage of silver."

A NEW mining district, called Solo, has been organized in San Bernardino county, and S. V. Morris has been elected recorder. The boundaries of the district are as follows: Commencing at a point at northerly end of Cronese lake and running thence easterly to Mesquite springs, on the Ludlow road; thence easterly to Marl springs on the old Hardyville road; thence northerly to Highland springs on the Ivanpah road; thence westerly to the northeast corner of the Five Points district; thence westerly along the southeast side line of Five Points district to the place of beginning.

FRESNO MINING DISTRICT.—A short time since, the miners of Fresno county, west of Fine Gold District, met and formed a new one called Fresno Mining District. A correspondent writes us that the new district is showing up some fine prospects, and by early spring good reports will be heard from them.

PRACTICAL HYDRAULICS.

NUMBER 16. COPYRIGHTED.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

Then $8.448 \times 5 = 42.24$ feet loss of head in 5 miles;
 $400 - 42.24 = 357.76$ feet effective head.—Ans.

Comparing results with respect to the 2.5-foot pipe of Ex. 72, and the 3-foot of Ex. 73:

$357.76 - 294.40 = 63.36$ feet, it is seen that the loss of head in the 3-foot pipe is 63.36 feet less than in the 2.5-foot pipe, which, in matters of economy, is of no little importance.

Ex. 74.—The elevation of the Guenoc Reservoir Site of the Feather River Water Co. is 1015 feet above the city base of San Francisco. The measured distance of pipe-line between the reservoir and the city is 104.83 miles. How many gallons of water a day (24 hours) will a pipe 40 inches diameter, whose inlet is at the reservoir, and outlet at San Francisco, deliver at an elevation of 350 feet above city base?

Cal.— $1015 - 350 = 665$ feet, total fall; $665 \div 104.83 = 6.34$ feet fall per mile.

In "fall per mile" column, Table 17, the nearest approximate fall to 6.34 feet is 6.336 feet, opposite which, in "40 inches," right hand column "diameters," is found 34.68 cubic feet, the discharge per second.

$24 \times 60 \times 60 = 86,400$ seconds in 24 hours; $34.68 \times 86,400 = 2,996,352$ cubic feet discharge in 24 hours.

In 1 cubic foot are 7.5 gallons nearly; $2,996,352 \times 7.5 = 22,472,640$ gallons.—Ans.

Ex. 75.—At a quartz mill, requiring 225 effective horse-power, the efficiency of the water wheel, in excess of the loss by nozzle resistance, is 60 per cent; the length of the pipe line is 3 miles, and the elevation of the reservoir, on point of water supply, is 500 feet above the point of application of the water at the mill. Required the diameter of the pipe to carry the requisite quantity of water?

Cal. 1st.— $225 \div .60 = 375$, total horse-power.
 $375 \times 550 = 206,250$ "foot pounds;" $206,250 \div 62.5 = 3300$ cubic feet $\times 1$ foot, which we will term *foot volume*.

Assume the loss of head by the internal surface resistances of pipe 10.56 feet per mile; then $10.56 \times 3 = 31.68$ feet, total loss of head.

$500 - 31.68 = 468.32$ feet, effective fall; $3300 \div 468.32 = 7.05$ cubic feet flow required per second.

In "fall per mile" column, Table 17, find 10.56 feet, opposite which, in right hand column "diameters," find 7.05 cubic feet. This is found under heading "20 inches." Hence the diameter of the required pipe is 20 inches.—Ans.

Cal. 2d.—By Cal. 1st, the "foot volume," corresponding to the "foot pounds," required at the mill, is $= 3300$ cubic feet $\times 1$ foot.

Assume 4.224 feet, the loss of head per mile due pipe resistances; then $4.224 \times 3 = 12.672$, total loss of head; $500 - 12.672 = 487.328$ feet, effective fall; $3300 \div 487.328 = 6.77$ cubic feet required per second.

In "fall per mile" column find 4.224 feet, opposite which, in right hand column, "diameters," find 7.32 cubic feet. This is found under heading "24 inches." Hence the diameter sought is 24 inches.—Ans.

Cal. 3d.—By Cal. 1st, the "foot volume," corresponding to the "foot pounds," required at the mill, is $= 3300$ cubic feet $\times 1$ foot.

Assume 21.12 feet, the loss of head per mile due pipe resistances; then $21.12 \times 3 = 63.36$ feet, total loss of head; $500 - 63.36 = 436.64$ feet, effective head; $3300 \div 436.64 = 7.55$ cubic feet required per second.

In fall per mile column find 21.12 feet, opposite which, in right hand column, "diameters," is found 7.65 cubic feet—a very near approximate to 7.55 cubic feet, the required quantity. This is found under heading "18 inches." Hence the diameter sought is 18 inches.—Ans.

Maximum Work.—To determine the maximum work, which water subjected to flow through a long pipe under pressure will perform, on issuing from the pipe:

Let h = the total head, exclusive of the inlet head, which, rarely in practice, exceeds 1.5 feet.

$a = h_f$, the friction head, expended in overcoming the resistances within the pipe.

d = diameter of pipe.

l = length of pipe.

$r = \frac{d}{4}$, hydraulic mean radius regarded constant.

c_f = coefficient of friction of resistances within the pipe regarded constant.

g = acceleration of gravity.

v = velocity of water in the pipe per second.

\bar{n} = ratio of circumference to diameter of pipe.

$h = h - a$, head for effective work.

W = total weight of water discharged per second.

w = weight of a cubic foot of water.

$\frac{\bar{n} d^2}{4}$, area of cross section of the pipe.

u = maximum work performed by the water per second.

Then $u = W h_f = a v w h_f$. (142)

Substituting in (142), the values of

$$a = \frac{\bar{n} d^2}{4}, v = \left\{ \frac{2 g r h_f}{c_f l} \right\}^{\frac{1}{2}} \text{ of (Eq. 129).}$$

$$r = \frac{d}{4} \text{ and } h_f = h - a.$$

$$u = W h_f = \frac{\bar{n} d^2}{4} \left\{ \frac{2 g d}{c_f l} \right\}^{\frac{1}{2}} \frac{1}{2} x^{\frac{1}{2}} (h - x). \quad (143)$$

Differentiating (142), omitting the constant factors $\bar{n}, d, g, c_f, l, 2$ and 4,

$$\frac{du}{dx} = 0 = \frac{h x^{-\frac{1}{2}}}{2} - \frac{3 x^{\frac{1}{2}}}{2}. \quad (144)$$

Transposing and reducing (144).

$$x = \frac{h}{3}. \quad (145)$$

Differentiating (144),

$$\frac{d^2 u}{dx^2} = -\frac{h x^{-\frac{3}{2}}}{2} - \frac{3 x^{-\frac{1}{2}}}{2} \quad (146)$$

As the second differential coefficient is negative, the function u representing the work performed is a maximum where $x = \frac{h}{3}$, as found in Eq. (145).

Thus it is shown that, in theory, the work performed by water after flowing through a pipe, is a maximum when the head expended in overcoming the resistances of the pipe is equal to one-third of the total head, exclusive of the inlet head. A modification occurs, however, with respect to this result, owing to the experimental coefficient of resistance being variable, by undetermined law, instead of constant, as assumed in our solution. Another source of variation is evidently due to difference in diameters of pipes. An inspection of Table 17 shows, that in practice, the ratio of the head expended in overcoming the resistances in a clean iron pipe is approximately equal to $\frac{1}{3}$, as a mean, instead of $\frac{1}{3}$ as found, of the total head. The remaining part of the total head amounting to nearly $\frac{2}{3}$ as a mean, applies to effective work.

Cal. 4.—By Cal. 1st, the "foot volume" (substituted for "foot pounds" for convenience of calculation) required at the mill, is 3300 cubic feet $\times 1$ foot.

Applying the ratio, $\frac{2}{3}$, proposed in the preceding article, there results: $500 \times \frac{2}{3} = 187.5$ feet, loss of head by friction; $187.5 \div 3 = 62.5$ feet, loss of head per mile.

In "fall per mile" column, the nearest approximate to 62.5 feet is 63.36 feet, loss of head per mile; then $63.36 \times 3 = 190.08$ feet, total loss of head $500 - 190.08 = 309.92$ feet; effective head $3300 \div 309.92 = 10.65$ cubic feet flow required per second.

Opposite 63.36 feet in "fall per mile column," Table 17, is found 13.65 cubic feet, nearest approximate to 10.65 cubic feet, the required quantity. This is found in "18 inches" column of contents for "diameters." Hence the pipe meeting the requirements is 18 inches diameter.—Ans.

Remark.—In "16-inch column," opposite 63.36 feet "fall per mile," is found 9.95 cubic feet, which is less than the required quantity. Hence a 16-inch pipe is too small. The velocity in a 17-inch pipe is $v =$

$\left(\frac{0.644}{1.19} \times 0.012 \times \frac{1}{4} \right)^{\frac{1}{2}} = 7.46$ feet per second for 63.36 feet fall per mile. The discharge per second in a 17-inch pipe will be $\left(\frac{1}{2} \right)^2 \times 7.854 \times 7.46 = 11.76$ cubic feet per second.

This amount, 11.76, exceeds the required amount of 10.65 cubic feet. Hence a 17-inch pipe will carry sufficient water to do the work. The margin of safety, $11.76 - 10.65 = 1.11$ cubic feet, however, is small.

An 18-inch pipe affording a margin of safety of $13.65 - 10.65 = 3$ cubic feet seems, by no means, large. Even a 20-inch pipe, with a fall of 63.36 feet per mile, and affording a margin of 7.34 cubic feet per second, would not exceed the limits imposed by D'Aubuisson, in his advice to engineers, if, indeed, it would the limits of true economy.

Reverting to the results obtained by 1st, 2nd and 3rd calculations for Ex. 75, and to the tabulated results corresponding respectively to these, or approximately so, it will be seen that in the first case there is no margin of safety, in the second .55 cubic feet, and in the third .10 cubic feet per second. This in practice would be inadmissible. A margin of .33 per cent is none too large. So that if on portions of the

lines steeper grades could not be had, it would be better to employ a "22-inch" pipe in the first case, a "27-inch" in the second, and a "20-inch" in the third case.

Inlet Head.—The inlet head is equal to the sum of the head expended in generating the velocity in a pipe, and the head expended in overcoming the resistance of entry.

Thus transposing Eq. (109), we have the inlet head,

$$h_i = h_r + h_e. \quad (147)$$

Substituting the values of $h_e = \frac{v^2}{2g}$ of Eq. (110), and of $h_r = c_r v^2$ of Eq. (116), noting that $c_r = .505$ of Eq. (127),

$$h_i = 1.505 \frac{v^2}{2g} = .0234 v^2. \quad (148)$$

Rule 34.—The inlet head is equal to .0234 times the square of the velocity in the pipe.

TABLE 18.
Velocities in Pipes and Corresponding Inlet Heads.

Velocity Feet.	Inlet Head Feet.	Velocity Feet.	Inlet Head Feet.	Velocity Feet.	Inlet Head Feet.	Velocity Feet.	Inlet Head Feet.
.80	.015	3.68	.316	6.32	.933	10.00	2.34
.90	.019	3.76	.331	6.37	.948	10.50	2.58
1.00	.023	3.85	.346	6.42	.963	11.00	2.83
1.13	.030	3.93	.361	6.47	.978	11.50	3.10
1.27	.038	4.00	.374	6.52	.993	12.00	3.37
1.39	.045	4.09	.391	6.57	1.01	12.50	3.66
1.50	.053	4.17	.406	6.61	1.02	13.00	3.96
1.60	.060	4.25	.421	6.66	1.04	13.50	4.27
1.70	.068	4.32	.436	6.71	1.05	14.00	4.59
1.79	.075	4.39	.452	6.76	1.07	14.50	4.92
1.88	.083	4.47	.467	6.81	1.08	15.00	5.27
1.97	.090	4.54	.482	6.86	1.10	15.50	5.62
2.00	.094	4.61	.497	6.91	1.11	16.00	5.99
2.04	.098	4.68	.512	6.95	1.13	16.50	6.38
2.12	.105	4.75	.527	7.00	1.15	17.00	6.76
2.20	.113	4.81	.542	7.04	1.16	17.50	7.17
2.27	.120	4.87	.557	7.09	1.17	18.00	7.58
2.34	.128	4.94	.572	7.13	1.19	18.50	7.99
2.41	.135	5.00	.585	7.18	1.20	19.00	8.45
2.47	.143	5.07	.606	7.22	1.22	19.50	8.90
2.54	.150	5.14	.617	7.26	1.23	20.00	9.36
2.60	.158	5.20	.632	7.31	1.25	20.50	9.83
2.66	.166	5.26	.647	7.35	1.26	21.00	10.32
2.72	.173	5.32	.662	7.40	1.28	21.50	10.82
2.78	.181	5.38	.677	7.44	1.29	22.00	11.33
2.84	.188	5.44	.692	7.48	1.31	22.50	11.85
2.89	.196	5.50	.707	7.53	1.32	23.00	12.38
2.95	.202	5.56	.722	7.57	1.34	23.50	12.92
3.00	.211	5.62	.737	7.61	1.35	24.00	13.48
3.05	.218	5.67	.753	7.65	1.37	24.50	14.05
3.11	.226	5.73	.768	7.70	1.38	25.00	14.63
3.16	.232	5.79	.783	7.74	1.40	25.50	15.22
3.21	.241	5.85	.798	7.78	1.41	26.00	15.82
3.26	.248	5.90	.813	7.82	1.43	27.00	17.05
3.31	.256	5.95	.828	7.86	1.44	28.00	18.35
3.36	.263	6.00	.843	7.90	1.46	29.00	19.78
3.40	.271	6.06	.858	7.94	1.47	30.00	21.06
3.45	.278	6.11	.873	8.00	1.50	35.00	28.67
3.50	.286	6.17	.888	8.50	1.69	40.00	37.34
3.55	.293	6.22	.903	9.00	1.90	45.00	47.39
3.59	.301	6.28	.918	9.50	2.11	50.00	58.50

Ex. 76.—The velocity in a 14-inch pipe is 4.18 feet. What is the total head, the pipe being one mile long?

Cal. 1st.—Find in velocity column, Table 17, for "14 inches diameters" of pipes, the given velocity, 4.18 feet, opposite which, in "fall per mile" column, is found 26.40 feet, the head required to overcome the resistances of the pipe.

In velocity column, Table 18, find 4.17 feet, nearest approximate to the given velocity, opposite which, in "inlet head" column, is found 4.06 feet. Then

$$26.40 + 4.06 = 26.806 \text{ feet, total head.} \text{—Ans.}$$

Cal. 2d.—Find, as by Cal. 1st, the fall 26.40 feet.

By Rule 37:
 $(4.18)^2 \times .02337 = .4083$ feet, inlet head; $26.40 + .4083 = 26.8083$ feet, total head.—Ans.

Ex. 77.—A pipe, 33 inches diameter, being 5 miles long, and the velocity of flow in it 9.80 feet per second, what is total head?

Cal. 1.—In Table 17, opposite 9.80 feet, velocity for a "33-inch" pipe, find in "fall per mile column," $47.52 \times 5 = 237.6$ feet, head due resistances in pipe.

In Table 18, in velocity column, the nearest approximate to the given velocity is 9.83 feet, opposite which, in "inlet head" column, is found 2.257 feet; then $237.6 + 2.257 = 239.857$ feet, total head.—Ans.

Cal. 2.—Find, as in Cal. 1, the friction head $= 237.6$ feet.

By Rule 34,
 $(9.8)^2 \times .02337 = 2.244$ feet, inlet head; $237.6 + 2.244 = 239.844$ feet, total head.—Ans.

Remark.—The inlet head, except in case of great velocity, is, in practice, usually omitted as insignificant. Thus applying it in Ex. 75, the velocity due the friction head, 63.36 feet, employed in Cal. 4, is by Table 17, 7.73 feet for an "18-inch" pipe.

By Table 18, the inlet head, due 7.74 feet velocity nearest approximate to 7.73 feet, is 1.40 feet, which is seen to be small in comparison with the given head of 500 feet.

Mineral Lodes.

(Continued from Page 94)

It will be seen that the defendant in the principal suit occupies the position of the plaintiff in the cross-action. The issue formed upon the pleadings of the cross-action were brought to trial before the principal case, on a ruling by this court that it is an equitable action, and on the assumption that it is so related to that case that the decision in it will affect the determination in the principal action. The testimony shows that

The Eureka Claim

Was located in the year 1870. In accordance with the mining law of 1866, and the Bullion claim was not located until several months after the Eureka, a patent was granted for this Eureka claim on September 27, 1875, "pursuant to the act of 1866, the amendment of 1870, and the act of 1872," giving exclusive right of possession and enjoyment of all the lands included within the exterior lines of said survey not herein excepted from these presents, and of 2,200 linear feet of the said Eureka mine, vein, lode, ledge, or deposit, for the length hereinbefore described throughout its entire depth, although it may enter the land adjoining, and also of all other veins, lodes, ledges or deposits throughout their entire depth, the tops or apexes of which lie inside the boundary lines of said survey at the surface, extended downward vertically, although such veins, lodes, ledges or deposits in their downward course may so far depart from a perpendicular line as to extend outside the vertical side lines of said survey; provided that the right of possession hereby granted to such outside parts of said veins, lodes, ledges or deposits shall be confined to such portions thereof, as lie between vertical planes drawn downward through the end lines of said survey at the surface, so continued in their own direction that such vertical planes will intersect such exterior parts of said veins, lodes, ledges or deposits. And provided further, that nothing in this conveyance, shall authorize the grantees herein, their successors or assigns, to enter upon the surface of a mining claim owned or possessed by another. To have and to hold said mining premises, together with all the rights, privileges, immunities, appurtenances of whatsoever nature thereunto belonging, unto the said Eureka mining company of Utah, and to their successors and assigns forever, subject, nevertheless to the following conditions and stipulations: First—That the grant hereby made is restricted to the land hereinbefore described as Lot No. 39, of 2,200 linear feet of the Eureka mine, vein, lode, ledge or deposit, for the length aforesaid throughout its entire depth as aforesaid, together with all the veins, lodes, ledges or deposits throughout their entire depth as aforesaid, the tops or apexes of which lie inside of the exterior lines of said survey, as against all persons claiming under locations made upon such other veins, lodes, ledges or deposits, subsequent to May 10, 1872, but subject to the rights of other parties to follow any other vein or lode, with its dips, angles and variations, legally hold under a location made prior to such date.

At the conclusion of the plaintiff's testimony, a motion for a non-suit was made, and the ruling of the court thereon eliminated many questions of law from this controversy. The proof then showed that the Eureka claim was located along the course or strike of the Eureka lode, the same having a clearly defined apex throughout the entire length of the claim, and that towards the northern end of the claim the lode was very broad, extending westerly beyond the side lines of the Eureka and apexing in the Bullion. It was contended by the Bullion, that

A Location Upon a Vein.

The apex of which is wider than the location does not include the whole vein. That when the outcrop is so wide that it extends into adjoining claims, then the side lines must be run down vertically. This court overruled the motion and summed up its conclusions of law upon the facts as then presented, as follows:

First—The first locator upon the apex of a vein or lode is entitled to the entire width of the vein or lode, within the end lines of his claim, so long as the vein in its course or strike, remains within the side lines of the claim.

Second—The statute of 1872, instead of restricting the rights of locators, enlarged them so as to include not only the vein or lode first discovered, but also all other veins or lodes which have their apexes within the claim.—Copp's Handbook of Mining Law, 7.

Third—In the present case there can be no question as to the right of the Eureka Mill Mining Company

To the Entire Lode

In controversy. The location was made prior to the location of the Bullion; it was made under the law of 1866. The law of 1866 gave to the locators the entire lode, and the patent issued to the Eureka Company, carefully preserves all the rights gained by being located under the law of 1866.

Patent titles, when granted, relate to the first initial step, which is the foundation of the right, and in pursuance of which the patent is granted—Kahn vs. Telegraph Company, 2 Utah, 188.

(To be Continued.)

USEFUL INFORMATION.

Belt Shifting.

Have you got belt-shifters on the lathes in your shop? Can you run the belt off the spindle pulley, and then guide it upon the big steps of an over head pulley, with a neat little gas-pipe rig?

Can you do this, or must your men juggle the belt up there by slight-of-hand, or coax it up with a shaft measuring stick or a ten-foot pole?

That belt is very greasy; it will not catch on that smooth pulley; you get desperate, give a big lift with your pole and the belt catches, but it takes the pole with it, and your oil can, and your hat and spectacles, and the gas fixtures, and wipes them all up.

This business is all nonsense. Get enough one inch steam pipe to reach from the floor above to your floor, or to a nice step attached to the latho bed. Set it to line with the middle step of the overhead pulley, and about 12 inches from it.

Put a tee in the pipe just below the lower side of the pulley. Screw an eight-inch or ten inch pipe into the tee. Now make a stirrup belt-shifter, just like the one on that screw planer. Make the shank to slide in the short piece of pipe, and of the same length. Put up a couple of stops, or nail up two pieces of board to the floor joist, so that the belt arm cannot turn far enough to throw beyond the big or small step. Clump on a handle or make one with another tee and long nipple, placed where convenient to get hold of.

Put the belt through that stirrup guide, and you can shift your belt ten times while your neighbor is hunting up a greasy pole.

OIL PAINT FOR FLOORS.—For the painting of floors with oil paint, we should, says the *Builder and Woodworker*, only select such as contain earthy coloring substances and no lead, as all paints containing the latter wear off too easily. A floor that is covered with oil paint, and which is comparatively easily rubbed off, can safely be considered to contain lead. Lead is generally added on account of its superior density and body, and also being much more easily applied than most other substances. Even varnish that has been prepared by the use of litharge is objectionable, on account of being too readily worn off. Two coats of paint are usually employed, and care should be observed not to apply the second before the first is fully dry. If it is desired that the floor should present a varnish-like luster, the following may be employed, whereby the paint becomes even more durable: Dissolve two parts of shellac in eight parts of alcohol of about 80 per cent, and add to it one-quarter of a part of camphor. When the whole has been completely dissolved it can be filtered or strained through a cloth, in order to separate the suspended impurities. With this lac the floor is painted over once or twice, as may be required. By the application of the lac the paint adheres much better and is not so easily worn as though it were directly exposed; and when the lac has been partially removed, all that is necessary is to renew the simple application of the varnish.

ANCIENT DYING.—The use of colors was certainly known to the Americans from the most remote antiquity. The ochres, soot-black and lime doubtless furnished them their first coloring elements, and there was nothing in the idea of using these pigments above the most primitive conceptions. Experiment induced a rapid progress, and men learned to extract natural colors from roots, stems, leaves, fruits and seeds. A colored matter was also borrowed, like the Tyrian purple, from sea-mollusks. The Peruvians and the Mexicans knew how to place the colors upon their cloths. The goods were then exposed to the action of the light, and tints varying from a delicate rose to a dark violet were obtained. The colors were so fixed that they were not even modified by the decomposition of dead bodies. In the collection of cloth from the Peruvian huacas at the museum of the Trocadero, in Paris, wrappings of mummies that have been prepared for centuries still retain their primitive color on their time-eaten threads.

TO POLISH HORNS.—To polish common cows' horns and give them a fine gloss for fancy work, first scrape with glass to take off any roughness, then grind some pumicestone to powder, and with a piece of cloth wetted and dipped in the powder, rub them until a smooth finish is obtained. Next polish with rottenstone and linseed oil, and finish with dry flour and a piece of clean linen rag. The more rubbing with the stone and oil, the better the finish.

INDIFFERENT WORKMEN.—It is wonderful how little success will satisfy a man. As soon as certain mechanics are enabled to accomplish a portion of their work with reasonable skill, they at once conceive the erroneous idea that they have nothing more to learn, and assume by this very attitude that they are masters of their art. Upon observing such workmen we are forcibly impressed with the belief that "a little learning is a dangerous thing."

VENTILATING CARS.—Every one who has crossed the plains by rail, or passed over the desert country through which the Southern Pa-

cific railroad runs between Los Angeles and Denning, is well aware of the great nuisance and inconvenience of the dust, if even the last crevice or door is left open for ventilation. All such will be glad to learn that a Salom, Mass., man has invented a method of ventilating railway cars by means of fans revolving underneath the car, through gearing attached to the axles. The air is forced up into the car through pipes having bell-shaped, movable openings above each seat; but this air is freed from dust by passing first through water. The Boston & Lowell road is testing the device.

PNEUMATIC TUBES NOT NEW.—There is nothing new in the idea of pneumatic tubes. A pneumatic conveyor for letters, etc., was suggested by Dr. Lapin, in 1695; patented by Madhurst in England, 1810, on the compressed air principle, and by Valentine, in 1821, on the exhaust principle.

GOLD LIQUID.—Mix bronze powder with gum water; a little spirits of wine will make it keep better. The proportions are easily ascertained by trial. Pieces of glass may be put in the bottle to assist in shaking up the heavy powder, which settles at the bottom.

THE ENAMEL ON BRASS SIGNS, by which the letters which are cut into the metal are filled up, is made as follows: Mix asphaltum, brown japan and lampblack into a putty like mass, and then fill in the spaces, and finally clean the edges with turpentine.

BRONZE.—Bronze is a mixture of copper and tin, and sometimes lead, the proportions of which vary somewhat, but are usually nine to one. It is often adulterated with zinc, but when this is the case the surface honeycombs on exposure.

TO REMOVE VARNISH without injuring paint, brush on spirits of ammonia or hartshorn, which softens the oil, allowing of its being rubbed off easily.

SOLID LEATHER SHOE BUTTONS are now made at the rate of two or three hundred per minute. They grow a brighter jet the longer they are worn.

POLISH FOR MARBLE.—One-half ounce of magnesia; two ounces oxalic acid; one pint of warm rain water. Use a white woolen cloth.

GOOD HEALTH.

A Genuine Mind Cure.

A lady at the South End was enjoying a visit from her mother, who had been stricken with paralysis some years previous. As soon as she arrived at her daughter's home she stipulated that she must sleep downstairs, as her health would not permit her to climb upstairs. The man of the house, like a dutiful son-in-law, gave up his bed below and went upstairs himself. Finally a severe storm broke out, and the lightning and thunder were terrific. The lady of the house, a little timid, thought she would light the gas in the dining-room. As she had done so and turned to go back to the bedroom she was startled to see the face of a rough-looking man peering at her from one of the piazza windows. The woman, in her night clothes, was chained with fear for only an instant, and then, without uttering a sound, she fled upstairs to awaken her husband. In the meantime the old lady, her mother, heard her daughter's bare feet pattering swiftly across the floor, heading for the stairway, and intuitively feeling that something was wrong, and entirely forgetting her own condition, sprang from the bed and fairly flew after her daughter. She reached the stairway, and, in spite of her paralytic infirmities, which she had so carefully nursed for years, found herself rushing upstairs. Her daughter heard the steps behind her, and supposed the man she had seen on the piazza had broken in and was pursuing her. Not for an instant did she imagine that her invalid and paralyzed mother could move so rapidly. This added to her fright and increased her pace. She rushed up to her husband's bedside shouting "Save me! Save me!" and looking round saw—her invalid mother.

"Why, mother, is this you? I thought you couldn't walk upstairs."

"I thought I couldn't, but I never tried before."

Then the man of the house went below to reconnoitre as to the visitor on the piazzas, and grandma crawled into bed. She always went upstairs to sleep after that.

A squad of 15 gypsies had taken possession of the piazza to shelter them from the storm, and the gentleman, not having the heart to turn them out until the rain was over, allowed them to remain.—*Hartford Times*.

FITTING CHILDREN'S SHOES.—Children's boots and shoes should be accurately fitted, else permanent injury may be the result. Even if strict economy has to be practised in every other detail of the wardrobe do not be penny wise and pound foolish with regard to this matter. Many grievous troubles have been traced to the badly fitting boot. Happily the high heel, placed almost in the center of the foot, is fast disappearing, but there is still a tendency to cramp the toes. When women

realize that a broad sole gives the greatest comfort to the foot there will be no more of the lance-shaped thigs with narrow soles and spray uppers that are so ugly. It is a pity that all boots cannot be hand-sowed; for how many tender little feet are made to suffer from the heavy thread, and the cruel wire nails that so often force their way through the inner lining of a machius-sewed boot. An ill fitting boot, too large or too small, will rub the feet and sometimes cause acute inflammation. A young girl had long suffered from severe pain in the head, which extended to the eyes and caused so much distress that the eyesight became impaired. Several physicians prescribed various treatment, but without success. Finally a consulting physician asked to see her boots, which were of the most approved pattern, pointed toes, narrow soles and high heels almost in the middle of the foot. "Ah," said the doctor, "here is the cause of all your trouble. Get a pair of broad-soled, flat-heeled boots, and never put on those monstrosities again. My word for it, in a short time you will feel like a different person." All that the doctor said was fully verified. In a fortnight the unfavorable symptoms had disappeared and the young girl seemed to have received new life. Three years have passed since the sensible boots were first worn, and during all that time there has not been an ache or a pain to disturb the perfect health with which the girl is blessed.—*N. Y. Commercial Advertiser*.

OPPOSED TO BATHING.—He laid down a package which he had just finished tying up, and wiped his hands on the front of his vest. His stood behind the counter of a South-side grocery store. His face was broad and red, and overflowing with good nature and perspiration. He looked as though he might weigh two hundred.

"So you would like to see a man who is opposed to bathing, would you? Well, here he is; take a good look at him. He is never sick and never had a cold."

"You don't look as though you would go into a rapid decline soon."

"No; and I don't feel like it. I am 45 years old and weigh 195 pounds. I am opposed to bathing. If a man wants to open the pores of his skin once or twice a week and lay himself open to the attacks of disease, let him do it."

"How long ago did you discover this principle in hygiene?"

"If you mean when did I stop bathing, about ten years ago. Not entirely, mind you. I take a light invigorator twice a year, just to keep my skin fresh, you know. May be this is too often, but I find it agrees with me best. I get into a tub on the 1st of January and on the 4th of July. Now you are laughing, but remember, young man, I am older than you and have had experience. Did you ever see a cow haths? No, I thought not. A cow refrains from bathing by instinct, yet they are as clean an animal as lives. I merely take a rough towel every night and rub myself down, and change my clothes often. If the cholera comes here this season, I think I can defy it. I never had a contagious disease in my life, yet I have attended to people who had the smallpox, and have been among contagious diseases of all kinds."—*Pittsburg Dispatch*.

EXERCISE FOR INSOMNIA.—If you are not accustomed to walking, be careful not to become fatigued. So many women who wish to overcome their nervousness by the inhalation of fresh air and by exercise overdo the matter, and their last state is almost worse than the first. They walk until completely tired out, and return exhausted, having received no benefit, and then resolve that exercise is a delusion and a snare. A gentleman who was suffering from a complication of troubles, which induced extreme nervousness, but which were not of a sort to confine her to her bed, came to the city for treatment by one of our celebrated specialists. She had insomnia; could only sleep under the influence of chloral; was unable to take exercise, and had become utterly despondent. The physician told her she must take regular exercise in the open air. The patient declared it was impossible for her to walk. She could scarcely move about the house. The doctor, however, told her she must go out and walk, if it were only one block, but she must not tire herself. This advice was followed reluctantly. The first day two blocks were accomplished; the second twice the distance; at the end of a week the patient found no difficulty in walking half a mile in the park, after riding thither in the horse cars. The regular exercise soon enabled the sufferer to sleep well, and her general health was re-established.

THE TREATMENT OF FROST BITTEN FINGERS AND TOES.—Dr. Lapatin, in the "Proceedings of the Caucasian Medical Society," advises that fingers and toes which have been slightly frost-bitten, and which subsequently suffer from burning, itching and pricking sensations, should be painted, at first once, and afterwards twice a day, with a mixture of dilute nitric acid and peppermint water in equal proportions. After this application has been made for three or four days, the skin becomes darkened and the epidermis is shed, healthy skin appearing under it. The cure is effected in from ten to fourteen days. The author has found this plan very effectual among soldiers, who were unable to wear their boots, in consequence of having had frozen feet. They were, in this way, soon rendered capable of returning to duty.—*British Medical Journal*.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Operations at the Mahoney mine are delayed on account of the unsettled state of the weather. As there is but a scanty supply of wood on hand, it would hardly be safe to commence taking out water until the roads will permit of hauling, which will be a couple of weeks at least. The new skips have been taken to the mine and hung on the ropes. G. W. Horn, the foreman, has taken advantage of this delay, and has gone to his home in Sonoma county for a week. The gravel claim worked by Messrs. Strickland, Hughes and McKindly, situated about six miles above here, promises to pan out better this winter than it has done for years. The supply of free water is almost sufficient to run the claim. Every pan seems to prospect well, and everything indicates a good clean-up in the spring. Enos and Wm. Templeton, who are mining a short distance from town, came in this week with a bag full of gold. Enos carried the treasure, and Will acted as escort armed with a Spencer rifle.

AMADOR QUEEN.—*Ledger*, Jan. 30: Both mine and mill were brought to a standstill this week. A clean up was made at the mill a few days ago; the yield was not large, as considerable slate and dirt had been run through, materially reducing the average yield. The mine is idle for want of timbers and other material, the roads being too heavy to admit of any being hauled for some time to come.

MISCELLANEOUS.—The high water of Saturday last did considerable damage to the Volcano tunnel property. The recent heavy rains, giving an abundance of water for mining purposes, have given a stimulus to gravel claims around Volcano. The water wheel experiments by Knight & Co., at the Zeile mill, have resulted so far in the discovery that by using two wheels instead of one a saving of 5 per cent in the amount of water can be effected. Experiments with the Pelton wheel have not been commenced as yet.

Calaveras.

MILL.—*Mt. Echo*, Feb. 2: The mill at the Tozer mine started up for the first time last Monday. It reported as doing satisfactory work. We will particularize more fully in future regarding its pulverizing qualities. The stage plying between this place and Mokelumne Hill has failed to make its schedule time during the past week, owing to high water. It is reported that work will be resumed in the Gold Cliff mine in a few weeks.

Contra Costa.

THE CENTRAL MINE AFIRE.—*Antioch Ledger*, Jan. 30: Last Sunday morning upon entering the Central mine at Stewartville, it was found to be on fire. The fire was in the engine room, and the heat was so intense and the smoke so dense that no one could go in to see how much damage had been done or how far the fire had extended. The mine was immediately closed up to smother the fire out if possible, but when the covering was taken away, and they entered the mine to see if it was out they found it still burning. By the use of a hose to carry water to the fire, it was put out on Thursday afternoon. The necessary repairs will be made, and work will be resumed in a few days.

El Dorado.

LOTUS.—*Cor. Placerville Observer*, Feb. 2: The Mountain Peak or Hard Scabble mine, north of this place, after having been shut down for a month or so, was started up last week, and is now being worked night and day, with Bomback, Hanten and Shultz at the wheel.

GOLD ORE.—The Hale & Norcross mine, which is the southern extension of the Mount Pleasant, at Grizzly Flat, and owned by Anon Melton and Denis Gally, bids fair to prove as rich and permanent as the mother mine. The Hale & Norcross has been prospected to a considerable depth for a distance of two hundred feet, showing a well defined ledge of ore bearing much free gold, though the rock is not of the specimen character. We have a number of samples of ore from this mine on exhibition at the *Observer* office, which is open to inspection by any of our friends.

POVERTY POINT.—The Poverty Point Mill is to be started up again this week, and will be fed on ore from the diggings now being worked by Myers and ren, who are to run through about 150 tons. The mill which is a five stamp battery, is the property of Rulofson & Likens. These men some months ago visited the Point, and finding the character of the country to be principally porphyry, with an inexhaustible supply of quartz, hundreds of tons of which were on dumps ready to be hauled and crushed whenever the facilities presented themselves, were not long in concluding that a custom mill would not only supply a long felt want but would be remunerative as well. They accordingly put up a mill, one of the rotary pattern, which after repeated trials was found to work so unsatisfactorily that they immediately substituted the present and more compensative one. The first shipment of ore crushed at this mill, some two weeks ago, was from the Gentle Annie mine owned by Fred Montgomery and George Hilbert; and while the result of the clean-up was not as encouraging as the owners thought it would be, still they have not lost their confidence in that the mine will eventually develop into a desirable property. They are making preparations for another crushing which will be made just as soon as others are accommodated. We learn that Chub Napier has on hand several hundred tons of high grade ore ready for hauling. Joe White has also in readiness for shipment a large dump of ore. When the weather moderates and the roads become passable, Poverty Point will rejoice in a boom that will impress upon the people the urgency of transforming the name from Poverty to Prosperity Point.

Inyo.

AT WORK.—*Inyo Independent*, Jan. 23: A few men have been put to work in the Chulula mine. John C. Eddy has put a few men to work in one of his mines at Riley. Lasky has ten men at work in the Keynot mine; they are getting out good ore. Two carloads of ore were sent down from Elina to the Swansea furnace a few days ago. John Anton has leased the McEvoy mine and mill in Beveridge,

and will begin work in a few days. At the Union mine, Cerro Gordo, Tom Boland has about the usual number of men employed. A good deal of ore from the mine is taken to the furnace at Swansea.

Mono.

BENTON.—*Cor. Inyo Register*, Jan. 29: We love to see stuff rolling into Benton. We hope Dr. Griswold is correct when he remarked the other day that "there will be mining around Benton a hundred years hence." Should half or even a fourth of the mining claims enumerated in a late issue of the *Register* by your genial Benton correspondent prove remunerative, this farming section would be particularly benefited thereby. Most of the claims mentioned in that article are but a short distance comparatively from this valley. The entire distance from Round Valley to Millner's store, Benton, is only twenty-five miles according to the survey via the Yellow Jacket, another via Clover Patch. In case of a mining boom in that region a good wagon road would be built direct from here to Benton. It is rumored that more than one company will be operating in Mammoth next summer; also the contemplated works at Mono lake; thus will be created a new market not farward for us.

Nevada.

THE CROWN POINT MINE.—*Grass Valley Union*, Jan. 31: The station at the foot of the 180 level of the Crown Point mine has been completed during the past week, and a contract has been let for lowering the pump and putting in a skip track to the 300 level. This work will be commenced on Monday, and prosecuted with vigor. As soon as the level is free from water the drifts will be run both southeast and northwest from the shaft; and it will very soon be determined whether the ledge holds its size and richness on this level. The southeast drift on the 180 level is being driven as fast as possible, and is already in a distance of 275 feet, with a 5-foot ledge showing in the face. The rock increases in richness as the drift advances. On Friday a very rich strike was made in the slope of the 180 level, and some of the finest specimens ever produced in this district were brought to the surface. The specimens show plenty of free gold, in fact show nearly as much of the precious metal as rock, together with galena and heavy sulphurets. Some of these specimens were brought to town yesterday and attracted considerable attention, although such things are of an every-day occurrence in Grass Valley. All the machinery about the mine is working well, and many more improvements will be made when the ditch from the Idaho is completed. The Crown Point is destined to be one of the great paying mining properties of the district.

THE DEADWOOD MINE.—*Transcript*, Jan. 3: The work of repairing the old tunnel of the Deadwood mine, at Willow Valley, is about completed. There remains about 400 feet of new tunnel to make before the former workings can be penetrated at the desired point. It is expected that in running this extension of the tunnel (which is to be done without loss of time) some good bodies of ore will be opened. The stockholders of the Deadwood are resolved to put the mine on a producing and profitable basis if energy can do it.

WATER POWER FOR MINES.—*Foothill Tidings*, Feb. 2: In an interview with Mr. David McKay, last evening, he informed us that the Empire Mining Company had now completed all their arrangements for the introduction of water power at their mines. The company formed is a strong one. It will be an immense saving to the Empire Company in fuel, and will give them better power than steam. The newly organized company do not propose to stop their enterprise at the Empire, but will carry it further, so that all the mines now in the southern part of this district can have the benefit of the enterprise. Many of these mines are now closed, and have been for a number of years, just because the cost of hoisting and pumping by steam was to great an expense, and would soon eat up the profits of low grade ore. There is the Omaha, Bullion, Hartley, Allison Ranch, Franklin and others which have now slipped our memory, that will start and will be in active operation and paying dividends before another year rolls around. If the present company, now negotiating for the Allison Ranch mine, do not take it (and we seriously doubt it) the new water ditch will be a higher incentive for capital and enterprise to take hold of that mine. The new company formed to carry out this water enterprise is not composed entirely of the Empire Mining Company, as is supposed by many, but is almost entirely composed of gentlemen who have heretofore had no interest in this county. It is estimated that the cost of introducing this power will be over \$100,000. The water will be from the South Yuba Canal Company, and will be conveyed by ditch and pipe a distance of nearly four miles. The work for constructing the ditch and reservoirs will soon commence, and it is expected that by the first of May the Empire will shut off steam and turn on water. Members of the new company are expected here any day to make arrangements for carrying out the enterprise.

ORE.—*Georgetown Courier*, Jan. 28: During the year 1885 the Terrible mine produced 1,131,835 pounds of ore. A millrun of ten tons of ore was made from the Centennial mine last week. Reports are current that work will soon be resumed on the Highland Chief and Hugo lodes, on Silver creek. William and John Jay Smith are exerting their muscle on Columbian Mt. these days, developing their Nabob lode. Barrett & Fletcher's mill at Empire is running steadily. The new concentrator recently put in has not yet been tested. It is reported that the Cashier and other properties at Empire have been leased to a syndicate of capitalists with Tabor at the head. The new crushers and other machinery for the Stanton Engineering Company arrived this week, and will be immediately placed in position for operation. A millrun of 40 sacks of ore was made last week from the Queen of the West lode, in the Horseshoe. The mineral yielded as second class, 281 ounces silver to the ton. Wing & Co., lessees on the Johnson lode in East Argentine district had a millrun of 32 sacks of ore from the workings last week. The ore returned 193 ounces silver and 1½ ounces gold per ton. George Anderson, who is leasing on the South American lode, on Republican Mt. has exposed a good vein of ore. He brought down 55 sacks of ore last Saturday, which we understand milled well in silver and lead. Duncan Drummond is steadily pushing the adit ahead on the Candalaria lode on Columbian Mt. The adit is in 100 feet. This vein crosses all the main ledges on the mountain, and it is the intention of the owners

to drive the adit ahead to intersect with the Etta and other promising lodes. The developments on the John Welch lode, situated on Fall river and owned by Michigan parties show a discovery shaft and an adit on the vein about 65 feet in length, the breast of which shows a vein of auriferous quartz, about two inches in thickness. This working has steadily improved as exploration progresses.

Sierra.

MILL RUNNING.—*Mt. Messenger*, Jan. 30: Jesse Carney has now been running his quartz mill at the head of Jim Crow about a week. Everything works well. A large amount of work is being done at the Downville foundry for the Young America, Cleveland and other Sierra mines.

RUBY.—Ruby will be yet one of the largest gravel mines in Sierra county. The last week's cleanup was 143 ounces of gold. One nugget weighed 33½ ounces.

Siskiyou.

HAPPY CAMP.—*Yreka Union*, Jan. 28: Work on the Smart & Co. claim is temporarily suspended on account of a break in the ditch caused by accumulation of slush snow.

QUARTZ AND PLACER.—*Yreka Journal*, Jan. 30: The recent storms have created a lively boom in the dry diggings and hydraulic claims. Considerable gold has been realized from the high gulches and ravines, which can be worked only during such winters as the present, to furnish water at the summits of mountains. Louis Scheld is now busily engaged in working the Pellett and Scheld hydraulic claim, in Greenhorn gulch, there being an abundance of water lately, to crowd operations day and night. The Chinese Hydraulic Company, at the north end of town, is also working day and night, with a full supply of water from Greenhorn ditch. At Hawkinsville all the companies are at work, with a good supply of water from both Long and Canal gulches, and the Big ditch also furnishes a fine quota to those who have leased it. On the various creeks in Scott valley the hydraulic and placer miners are all busy raking in the gold while the warm rains prevail, to afford plenty of water in the various gulches, streams and ditches. Klamath river has been up to eight feet above the low-water mark, and the freshets have cleaned out the stream of the vast amount of tailings accumulated for several years past, which will be of great benefit for mining operations. The stream had become choked up to a great extent at many points, and could be forded very easily last summer at numerous places below and above Scott river. The miners started out a couple of weeks ago to secure poles for windgirding in the spring, but have been obliged to postpone such work until a later period, when the roads are in better condition and the ground dries up to some extent. As soon as spring opens all the claims will require a great amount of lumber and poles for windgirds, which will give employment to many men and teams.

Shasta.

PLACER AND QUARTZ.—*Shasta Co. Democrat*, Jan. 27: The late rains stopped all work at the mines on Squaw creek for the time being. Andy Fife's quartz mill at Lower Springs is running on custom rock day and night with first-rate results. We are informed that the Iron Mountain company will not be able to commence reducing ore before the first of March. As soon as the road will bear heavy loads a new quartz mill will be taken in to the Bullychoop mines. This will make four mills for that camp. Dr. Bell of Anderson owns a placer claim on Grizzly gulch from which last week he took out an ounce of coarse gold in two pans of dirt. A prospector named Decker has discovered on Bulgin gulch what is said to be another tellurium mine. The vein is a big one and the ore is said to be identically the same as that of the Salt creek tellurium mine. The mine owned by Bradberry and others of Red Bluff, situated a short distance west of the old Hall reservoir, although not attracting much attention promises to develop into a rich thing. A shaft is now down nearly fifty feet and ore continues to assay into the hundreds of dollars. We are informed that Wm. T. Coleman now owns some twenty-odd mining claims in the French Gulch district excluding the Niagara, which is yielding handsomely. On several of these locations he is running prospecting tunnels, all of which gives employment to quite a number of men at good wages. The owners of the Cressus mine on Squaw creek have succeeded in getting their engine and boiler on the ground despite the stormy weather of the past ten days. W. W. Nichols is building a wagon road from Copley into the Squaw creek mines. Heavy loads of ponderous machinery continue to be freighted through Shasta to Iron Mountain. Wm. Campbell, who was in town a few days ago, says that Mr. Ellsworth, superintendent of the mine and works, is erecting as fine and substantial works for size and capacity as can be found on any mine on the Pacific coast.

San Bernardino.

ARROW DISTRICT.—*Cor. Calico Print*, Jan. 29: Since writing you last week Arrow Mining district has had a visit from some mining experts. They came back to Providence apparently well pleased with their visit. As yet little work has been done, but what has been shown up well. The Mexicans are down about 40 feet on their mine, showing rich ore as on the surface and much more of it. The Golden Queen is also showing up well, and several other prospects are looking very nice. The owners of the Mountain Pass on the main ledge will commence work this week. The Red Cloud now shows a body of ore 12 feet wide and 150 feet in length, this claim assays very high and has a large quantity of ore in sight. A number of prospectors in this district are fetching in good gold rock every day. There is now no question but Arrow District will make a large camp.

MESCAL MINES.—Mr. W. A. Roberts has returned to this camp after examining the Oases mines; he speaks well of that country. He has left for Los Angeles and will return to Mescal in a few days to see to the working of bond on the Cambria mine. Mr. Sim Barrett has not returned yet from the green fields of San Bernardino; the pasture must be good in there.

IVANPAH MINES.—Messrs. Miller & Van Winkle had a crushing from the Alps mine. The boys have met with deserved success. Some of their ore pulped over one thousand dollars a ton. Van says that the green fields have no attraction compared with the glittering silver coin. Messrs. McFarlane & Barrett have been running during the week and turned out some nice silver bars. Two miners are working

on a lease on the old Consolidated mines. Winters, an old time Ivanpaher, has bought the Eugene mine and is meeting with success, having struck some rich ore. There are several other chloriders working at various mines, some doing well others making a stand off.

NEVADA.

CHOLLAR.—The tank at the 3100 level of the Combination shaft being completed, the pump column is being built up from that point to meet the Cornish pump on the 2900 level. This will be completed and in pumping operation by Wednesday next, after which sinking the shaft deeper will be taken into consideration. No other work is being done in connection with this mine at present. The heavy stone bulkhead on the 2800 level, 70 feet south of the Hale and Norcross south line being fully completed, was closed on Tuesday last, and the drift behind it allowed to fill. No water at all comes from that point where fifteen or twenty inches came before, being a relief to the big hydraulic pump of about 300,000 gallons per day.

OPHIR.—On the 300 level the west drift from the old Mexican shaft is now in 76 feet, 27 feet having been advanced during the week. Material vein porphyry with streaks of decomposed quartz. On the 700 level the progress of the joint Mexican and Union drift running northwest from the Ophir shaft is described under the Union Consolidated head.

CON. CALIFORNIA AND VIRGINIA.—About 300 tons per day continues to be the daily yield, which is reduced at the Morgan and Eureka mills, assaying a little over \$15 per ton. On the 1530 level the north-west drift towards the old bonanza stopes is in 508 feet, advancing at the rate of about 30 feet per week. The west drift on the 1400 level is in about 212 feet, advancing in good working ground.

KENTUCK.—Owing to the damage to the roads, hauling to the mills from this mine has had to be suspended, as well as the extraction of ore for the present. It will be some time yet before hauling to the Rock Point mill on Carson river, below Dayton, can be resumed, as the road which 'follows the bed' of Gold canyon at its lower end was destroyed by the recent flood and made impassable for teams.

SIERRA NEVADA.—The main north lateral drift on the 520 level has now attained a total length of 1620 feet, 56 feet having been added during the past week. The material is principally vein porphyry with streaks of clay, but little or no quartz. It works very favorably, allowing of a very good rate of advancement.

UNION CONSOLIDATED.—On the 500 level the main east crosscut is now in 546 feet, and making good advancement in favorable working ground. On the 700 level the joint Mexican and Union drift running northwest from the Ophir shaft, is now in 211 feet, and progressing at the rate of about 40 feet per week.

MEXICAN.—The lateral drift north from the east crosscut on the 500 level was extended 30 feet, making a total of 392 feet. Material, vein porphyry, with some little clay and quartz. The progress of the joint Mexican and Union drift on the 700 level is given in the Union Consolidated portion of this report.

CROWN POINT.—Some of the mining force had to be laid off for a few days, owing to the heavy storm, which impeded ore transportation and milling, but all are at work again, and the daily amount of ore extraction is up to the former standard.

ALTA.—The lateral drift north toward the Benton ground continues its steady rate of advancement. Material, vein porphyry and quartz, with streaks and bunches of low-grade ore.

MISCELLANEOUS.—The small outside mines and mills in Six-Mile canyon, which were stopped by the recent heavy storms, are all at work again.

Columbus District.

HOLMES.—*Candelaria True Fissure*, Jan. 30: We are preparing to do some work in the old 6th level during the present week in a prospect that we think will extend down and connect with the ore body near eastern end of 9th level. The stope 60 feet below the Morris ledge well. This stope has been very large for a long time, and it is now larger and stronger than ever. It is 80 feet long and looks exceedingly well. In the 8th level we are stopping in the Morris ledge. The stope is 150 feet long and is larger and better than at last report. This is a very productive stope. It will average 4½ feet wide for 150 feet in length. It is all good milling ore and goes to the mill as it is broken from the stope. In the eastern ore body on the 9th level we are stopping in the ledge above and below the level. We are running a drift from this stope toward the foot wall on a small streak of ore that assays very high. The foot streak still keeps up its north and south course, and will doubtless extend from hanging to foot wall. The ledge at this point is about 220 feet wide, and there is no place in the mine that looks more favorable for large and extensive ore bodies.

BICYCLE.—This is a new find, located by J. L. Callison. It is situated east of the Silver Boy. A shaft has been sunk on the ledge about 8 feet, where it shows a width of 4 feet of ore that assays \$118 per ton in silver. The formation is granite and porphyry, and the mine has an appearance of permanency. Mr. Callison feels very much elated over his prospects.

GENERAL GRANT.—William Dunlap is sinking on this mine. He is now down about 15 feet, and the ore improves as depth is attained. It is the intention to sink 100 feet before crosscutting. The ledge is about 14 feet wide and will work about \$25 per ton.

PROPOSE TO STAND IN.—A number of the chloriders are stacking their ore on the dumps to await the starting up of the new mill. They 'propose to stand in with home industry. That's right, boys.

CLIMAX.—Kent & Co. are still driving their new tunnel. They are now in 200 feet, having made 20 feet since last report. They expect to cut the ledge in a few feet.

Gold Mt. District.

STATE LINE.—*Candelaria True Fissure*: This property, located in Gold Mountain mining district, in the southwestern corner of this county, is again coming to the front, this time as a bullion producer, instead of a stock speculation. A new corporation called the State Line Consolidated Gold Mining Company, of New York, has taken bold and con-

solidated the different claims known as State Line Nos. 1, 2, 3 and 4, with the capitalization reduced to one-fourth. Thirty-six of the forty stamps in the mill are working during daylight hours and several very satisfactory bullion shipments have already been made. On the first level, where the old company quit work, thinking that they had lost the ledge, on account of a change in dip, good ore is being taken from both sides of the incline. At the depth of 186 feet a second level was opened and a crosscut started for the ledge in new ground. It struck the vein in far richer ore than any that had been developed above. The crosscut shows 18 feet of good milling ore. An upraise has been driven 54 feet, all in high-grade ore. A west drift has been run 50 feet, and an east drift 80 feet, and the ledge still holds out as good as where encountered. The upraise and the drifts have opened the ledge in fine condition for stoping, and enough ore is now in sight to run the mill to its full capacity for many months. The main incline is down 280 feet. The company has a large amount of wood and other supplies on hand, and the water supply is practically unlimited. There are 23 men all told about the different branches of work. Operations will shortly be begun on full time.

CALICO.—*Print, Jan. 29:* Some very rich ore is being taken out of the Waiho mine. Several chlorides have leases on the Bismark mine: some of them are taking out very good ore. The Jessie Tay and Rosebud have been bonded and leased to Messrs. Waterman & Porter, who have ten men taking out ore. The Blackfoot mines are once more being worked by chlorides. Some specimens taken from this ground have been shown your correspondent, running 600 ounces to the ton; the mines show up good mineral in several places.

JACKSON DISTRICT.

A MILL.—*Silver State, Jan. 30:* Jackson mining district, which was organized a year and a half ago, is assuming considerable prominence. George Clark, who left there a few days ago, says they expect to have the mill completed early in March. At present they are short of powder, and not much is being done in the mines. A saloon is to be opened there next week, and a barrel or two of whiskey was shipped there from Mill City this week. This is expected to stimulate prospectors, and new mining discoveries may be looked for before the Ides of March.

PEAVINE DISTRICT.

THE PEAVINE PROCESS.—The new process adopted for working the refractory ores of Peavine mining district, west of Reno, is described as follows: A new process for separating gold and silver from the baser metals, it is said, has been tried at Peavine with astonishing results. The ore is roasted in a furnace, then treated with a chemical fluid which separates the gold from the silver and both from the gangue and baser metals. A three-ton furnace and vats for treating the roasted ore have been erected at Peavine, and it is claimed that the refractory ores of that district are worked up to 85 per cent of their assay value, and the gold and silver is over 900 fine. The cost of treating ores by this process does not exceed \$3.50 per ton where fuel is not too high.

TUSCARORA DISTRICT.

GRAND PRIZE.—*Tuscarora Times-Review, Jan. 27:* Two hundred east lateral drift extended 26 feet, and 200 north drift 16 feet. No material change in the mine.

BELLE ISLE.—The past week have suspended work in east crosscut No. 2, 450 foot level, and resumed in the face of the north drift from east crosscut No. 1, same level.

NAVAJO.—No. 1 upraise on east lateral vein 350 feet level carried up a total height of 30 feet, south drift from east crosscut 250-foot level extended 11 feet east crosscut No. 2 same level extended 3 feet. Have started up and extended the Belle Isle and Navajo joint crosscut same level 15 feet.

WASHOE DISTRICT.

HALE AND NORCROSS.—*Enterprise, January 30:* Sinking the deep winze below the 3100 level constitutes about the only work being done in this mine at present, all forces being concentrated at that point. Last evening it was down to the depth of 97 feet below the floor of the 3100 level, having about 30 feet yet to go in order to reach the 3200 level. As this winze has been sinking at the unprecedentedly lively rate of 35 feet per week, it is easy to see that sinking but another week or less will carry it to the 3200 level. The ground is dry and works favorably, hence the excellent progress made in sinking. The Cornish pump has not been lowered, but a column is being built upward from the tank on the 3100 level to join the main Cornish pump above, connecting with it on the 2900 level. This pump will be completed and ready to start up by Wednesday next, after which sinking the shaft deeper will be in order.

GOULD AND CURRY.—All work in this and the Best and Belcher mine is concentrated entirely upon the proposition of draining the Osbiston shaft owned jointly by the two companies. The powerful surface machinery recently started into operation after nearly a year's rest, continues to work smoothly and effectually. The repairs to the shaft are made and the new pump tank on the 1600 level completed. Pumping was commenced last Monday and the water in the shaft is rapidly being reduced from its original depth of 837 feet. The shaft is 2700 feet deep—200 feet deeper than our local contemporary makes it—therefore it will take several days, perhaps weeks, before the shaft can be thoroughly drained.

ARIZONA.

LONGFELLOW.—*Clifton Clarion, Jan. 26:* But little development work is being done at present, nor is any of consequence being extracted. A small force of men are engaged in timbering and getting the ground in shape for extensive exploitation and extraction of ore. The company is preparing for a vigorous summer campaign, and the output for 1886 will be something handsome. The management of the property is all that could be desired, and would be difficult to improve upon. Immense quantities of ore are on hand, but awaiting the magic touch of the miner's pick to fall—and be converted into the merchantable article. At the Metcalf things move on in the even tenor of their way. The Little Annie is producing considerable quantities of high-grade ore.

WHITE HAWK.—Seventeen men are employed in getting out a medium fair grade of ore, yet not quite

so rich as that in the Annie. A tunnel is being started in, under the cut, to tap large bodies of ore supposed to exist further in the hill. This claim, with the others of the Metcalf group, at present working, employs together about seventy men. The King, Coronado and Queen mines will start up whenever the demand for copper will justify.

MORENCI.—The site is being graded and prepared for the concentrators immediately adjoining the smelter. The same power will be utilized in running the concentrators that is now employed at the smelter. The old concentrators are being taken down, preparatory to their removal to the new location. The smelter is running smoothly, and is turning out from 10,000 to 13,000 pounds of bullion daily. But a small force of men are employed in and about the smelter, and everything is conducted in a quiet, business-like manner. The Postoffice commands no small share of attention. About 150 men are employed at present.

Mr. Alex McLean, the foreman of the works, was too busily engaged at the time of our visit to devote much attention to the pencil pusher, but we promise to see him again, at some more opportune moment, when lost time can be made up.

GLOBE.—*Cor. Silver Belt, Jan. 23:* The Mayflower mining claim, owned by the Epley Brothers and J. L. Bichelder, is located on the northeast slope of the Quartzite mountain, a few hundred feet west and parallel to the Silver Fame, has had considerable surface work done by running tunnels and open cuts. The ore found here is similar in character to that of the Silver Fame, some of which is very rich. The Hartford and London mines, formerly the Silver Era and Etna, owned by Eastern parties, are situated about eight hundred feet west and parallel to the Mayflower. It has produced thousands of dollars and sent one or two men to Europe on tours of pleasure. The work so far done here consists of several irregular gashes in the crest of the hill, and the greatest depth reached does not exceed 75 feet. There is, to the best of my judgment, from 250 to 300 tons of ore on the dumps that will yield from 40 to 50 ozs. of silver per ton. The ores are free-milling, and with a mill conveniently located they could be reduced at a handsome profit. The Home Ticket mine, owned by E. L. Winterburger, F. F. Burke and J. B. Henry, is located on the southwest slope of the Quartzite, about one-fourth of a mile from the mines above described. This property has had a large amount of development done, consisting of one tunnel 120 feet in length along the ledge, and a winze midway in the tunnel down to a depth of 50 feet, which exposes a vein of ore throughout the entire workings, from eighteen inches to three feet wide. There is already on the dumps about sixty or seventy tons, that will yield without assorting 100 ozs. of silver per ton. The Arizona Central mine, owned by Dr. S. C. Heinemann, is situated six hundred feet east of the Ticket. It has had considerable surface work done, and has produced some exceedingly rich ore of a like character as that of the Ticket and Fame, and has several tons of ore of good grade on the dumps.

COLORADO.

ELK MOUNTAIN.—*Pilot, Jan. 30:* During the summer we expect to see a smelter erected here. We consider the mines far enough advanced in development, and with a good road to reach the ores of Aspen, everything is ripe for a smelter at this point. With the coal and coke, water and timber, iron and lime rock, coupled with the various kinds of ores mined right at our doors, it is certainly reasonable that the silver should be extracted here, which can be done, and save waste rock freight, and give a market for a much lower grade of ore than can be shipped to market at the present freight rates. We believe that by spring the proper parties with the experience and means will be on hand to build the much needed smelter. Mr. Metzler will start his mill on Monday, and run a 100-ton lot of Queen ore. He has been constantly improving his mill until he certainly has a model one. When Mr. Nichols took charge of it six months ago it required from ten to fifteen men to run it twenty-four hours. It now requires but three men to run it the same length of time. Garrett Fitzgerald was down from Redwell Basin this week. He reports the basin filled up with slides even with the rim.

MONTANA.

INDEPENDENCE DISTRICT.—*Butte Inter-Mountain, Jan. 29:* Near Burlington, the mining center of Independence district, there is considerable mining being done in a quiet way, the results of which promise well for the future of that vicinity. Recently lessees and purchasers have demonstrated that the mines improve with depth, at least as far as they have gone. In nearly every instance the ore has improved in quantity and quality below the water level. From all we could learn from observation, and from details given by those who should know whereof they spoke, the veins seem as large and as rich as those in the more developed districts in the immediate vicinity of Butte. The principal mines that are being worked in the district at present are the Blue Bird, Burlington and Nettie. There are quite a number of others on which lessees are working in a small way.

THE BLUEBIRD.—The main shaft of the Bluebird mine is 400 feet deep. A crosscut is being run from the bottom to cut the main vein, which will be reached within 40 feet from the present heading. They are driving this cut at the rate of four feet a day. The 300 foot level is also being worked. No stoping is being done as the intention is to develop the property and then determine upon the best method of disposing of the ore; perhaps works for its reduction may be erected in the vicinity of the mine. At a depth of 200 feet a level has been driven east 300 feet, where it connects with a tunnel which has also been run on the vein for a distance of 300 feet. A level 325 feet in length runs west from the main shaft at this (200 foot) station, making a total of 925 feet along the vein that has been opened underground, and throughout this distance the levels have been in ore. Besides the main one there are three other shafts on the lode, respectively two hundred, one hundred, and forty feet deep, which demonstrate the continuity of the vein for a distance of 1,300 feet along the surface.

THE NETTIE.—The lessees on the Nettie have only been working three weeks and have had trouble with their machinery and with water, so that they

are only now getting fairly started. Their shaft is 150 feet deep. The ore raised from the 60 and 100 foot levels and stopes has been at the rate of about 100 tons a month.

THE BURLINGTON has been traced for some distance by its outcroppings, and has several shafts. The main one, where Messrs. Edwards & Co. are working, is 150 feet deep. At this depth they are driving drifts east and west; the former being about 130 feet, and the latter 60 feet in length.

MISCELLANEOUS.—Messrs. Rodda & Odgers have a lease on the Fredonia. They are down about 100 feet. They hoist with a whim and are shipping ore regularly to the mills. The I. X. L. is also being worked by leasers. The Occidental has a shaft 75 feet deep, from which the lessees, Messrs. Connors and Colonel Thornton, are cross-cutting to reach the vein. Blodgett & Hannaker are sinking on the Sarsfield lode. They are now down 78 feet. The Silversmith lode, north of the Alice, is leased and being worked. The shaft is 90 feet deep. Here also they are cross-cutting for the ore vein, which they expect to reach in about ten days. The Arlington company has begun work on the Star of the West. At the Golden Rule the new boiler is in place, and sinking is resumed with three shifts. The lower levels are being continued east and west from the shaft, and stoping will begin in a few days. About 20 men are employed at the mine. The Azure is a continuation (east) of the Bluebird. It has a shaft upon it about 80 feet deep. The Mono is near and parallel to the veins just mentioned. There are two shafts on the lode about 75 feet deep. The ore is rich in manganese.

NEW MEXICO.

ORE.—*Silver City Enterprise, Jan. 29:* Twelve tons of 69 ounce ore was shipped from Jimmy Percell's Little Fat Man mine at Cook's peak last week. The ore is of a very desirable class and is sought after by the ore purchasers throughout this section. The mine promises well for the future. The Flower Queen, at Cook's Peak, sent six or seven tons of fine lead carbonate ore to the Denning smelter last week. A new strike of horn silver and sulphide is reported upon the Old Man mine. The discovery was made at the deepest point that mineral has been found upon the lower west tunnel. Two shifts are at present employed by Bernard McDonald upon the Red Cloud mine at Bullard's peak and they are getting out a fair grade of ore in quantity. Joe E. Sheridan has been in town during the past week, figuring upon the mill to be erected by the Sheridan mining company, at Cooney, and awaiting advices from his company. Everything is working satisfactorily and most encouraging reports are coming in from the mines, where a small force of men are employed in developing the property. Kingston, the rich camp of Sierra county, is keeping up its reputation handsomely. Among the recent new strikes there is one made by Captain Burns on the Uncle Jack mine. The ore body is said to be immense and of a good grade. Several carloads will be shipped from it shortly. Capt. Burns was the pioneer mine developer of Kingston, and his friends will rejoice with him at his good fortune. Thos B. Pheby informs us that connection was made between the upper and lower shaft of the Satisfaction mine, at Georgetown, Tuesday. The air has been very bad in the workings of this property for some time, but now the most perfect ventilation has been secured by the tunnel connection. A very rich strike is reported in the 60-foot level of the third shaft of the Cooney mine. A sample of the ore was taken, and the returns show 300½ oz silver and 17 oz gold. The ore is a copper pyrites and a grey quartz, and shows fully five feet between the walls. This new discovery is located south of the immense chimney that has produced such large quantities of ore, and is but 150 feet from the surface. North of the point from which this sample was taken but one wall has been encountered. The lead will be tapped from the first level as soon as the diamond drill now on the road arrives. This is the most important find made on the Cooney for many months.

OREGON.

JOSEPHINE CO.—*Courier, Jan. 29:* Desselles & Connell on Scott's Gulch, near Waldo, are pushing things lively with a giant. Mr. Havelin on Canyon creek is also tearing away dirt at a rapid rate with a giant. We are informed this is a splendid claim. All the mines on Althouse and its tributaries are running—some of them night and day. This will be a glorious season for Josephine miners. During this winter and last fall, prospecting for both placer and quartz mines in the county has been carried on more extensively than for some years past. We expect to hear a good report from Mr. Cliff Smith of this place, who is working a claim on Foot's creek. Cliff is full of energy and deserving of success. A contract has been let for a 200-foot tunnel on the Jewett ledge near Grant's Pass. As development proceeds on the old stand-by, it becomes more evident that the owners have a good property. Wm. Bybee's famous claim, producing a fine character of gold, on the head of Allen Gulch, near Waldo, is running one giant with every indication of a very profitable clean-up at the end of the season. Negotiations are pending for the purchase of J. T. Layton's claim on Applegate by a Chinese company of Portland. \$65,000 is the amount asked by Mr. Layton, and the mines are well worth it. John Hall is superintending Hall & Bybee's placer on Canyon creek. He is running one giant, and making the best of the season so far. They have abundance of water, and the promise of a grand clean-up when the streams run dry. Last week Joe Scott, who is interested with B. McNair in the gravel claim on Rogue river near the Big Yank, showed us two ounces of excellent fine gold from that bar which indicates that if it was worked with a hydraulic, it would pay handsomely. Simmons & Ennis, near Waldo, are running a cut from the Illinois river, intended for the purpose of developing their ground and getting into Shelly gulch. Next year these gentlemen will, no doubt, make some startling discoveries, as the dirt gives every indication of being rich. Mr. Henry Smith and E. F. Everitt of this place have a claim on Foot's creek on which they are ground sluicing with good prospects. J. Wimer & Sons are running two huge giants on their famous diggings—night and day. Mr. Geo. W. Wimer, the energetic superintendent, is vigorously pushing the work with eight men, and a very large yield of the "precious" will undoubtedly

be the result of this season's work. The Dry Digging northeast of Grant's Pass are no longer "dry," but every little gully is overflowing with water, and several parties are ground sluicing with good pay. These diggings can always be relied on for a "stake" when the season is propitious. The present is one of them, hence all the boys in that section are happy. On Myrtle creek some work is being done. This district, we are told is termed as being "spotted," but when the boys do get "on to it" they "strike it rich." All the miners on Cow creek are getting down to business in earnest. Some of the mines which have not been worked for some years are now producing well. John Catching and sons, we are informed by a gentleman from that section, are working their claim near Riddle, and up to this time have taken out over \$600. The *Courier* has information to the effect that the owners of the several mines on Coffee creek are working the ground with better indications of a profitable season's run than for some time heretofore. Marrian & Sands have well developed claim on Cow creek, near Glendale. They are running a hydraulic and taking out good pay. These gentlemen, we are told, have every indication of a large profit over all expenses this season.

UTAH.

REVIEW.—*Salt Lake Tribune, Jan. 29:* The week has been a stormy one, and the roads are almost impassable. But the movement of the metals has been fair. No special mining transactions have distinguished the week, but the snow-slides have been a terror. The great slides in Bullion Gulch, Idaho, and the more recent one in Thayne's Canyon, near Park City, Utah, have been fully described in the current news of the day. In the latter, four men perished. The receipts of bullion and ore in this city for the week, ending January 27th, inclusive, were as follows: Bullion \$78,936.55; ore \$53,470; total \$132,406.55. For the previous week, the receipts were \$130,458.27, of which \$9,048.27 was bullion and \$38,410 was ore. Fine bars of bullion received during the week were valued at \$38,852; base bullion at \$3,200. The Hanauer smelter produced during the week seven cars of bullion, \$19,580; the Germania, six cars, \$17,304.55. Ore receipts were \$6,200 from the Crescent, and \$47,270 miscellaneous, including ores designated as "silver and lead." The Ontario opens the year with the declaration of the usual monthly dividend of fifty cents a share, payable in New York on the 30th. Total of dividends to that date inclusive, \$7,100,000. The receipt of five cars of ore from the Horn Silver, marks the era, probably, of resumption of activity in that great property. The news from the mine is meager enough, and is kept so, but there seems to be no reason for doubt that a large body of ore has been tapped from the new workings.

LEACHING PROCESS AT SILVER REEF.—*Cor. Pioche Record, Jan. 26:* Including teamsters, wood-choppers, coal-burners, mill-hands and miners, there are between 350 and 400 men at work in and around Silver Reef, and if plans for contemplated enterprises are carried out, as expected, this force will be doubled within this year.

The great problem that our mining men have been trying to solve is a process by which low grade ore can be worked to an advantage, for without exception there is more of this character of silver rock in sight on the dumps and in abandoned stopes in this district, than there is in any one mining camp on the coast. You can pick up a piece of country rock anywhere on the Buckeye or White Reef that will assay from three to four ounces, while there are thousands of tons of ore scattered through the waste dumps in camp that will sample 15 ounces per ton. The Stormont and Christy companies have been working ore right along during the past year that does not average 15 ounces, while until a few months ago the chlorider could get nothing for rock that went less than \$30, as the mills of the present two companies were the only place in this part of the country where custom ore was crushed. Since the new leaching works have been nearing completion, however, the Stormont and Christy companies have been offering better terms to chloriders, as many of them were piling up their ore on the dump, and holding it in reserve until such time as the new leachers operated.

The new leaching works will have turned on steam by the time this reaches you, when its progress will be carefully noted by our resident mine owners, who devoutly wish to see it succeed. The new plant is located in the old Leeds mill building, about a mile from town. The leaching and precipitating tanks are made of California redwood, and the other part of the apparatus is constructed from the best quality of material. The tanks have a capacity of a hundred tons of slimes, and the managers are confident that they can easily handle seventy-five tons of ore every twenty-four hours. The company has been working tailings during the last year, in comparatively small works, with such success that they were induced to erect this new leacher on a grand scale. The Russell process will be used, as the managers have during their past experience found out its advantages, and obtained the sole right of using it in this country.

THE BURNT RIVER MINES.—*Portland Oregonian, Jan. 22:* Mr. Alexander Mayer, one of the principal shareholders, was yesterday elected president of the Burnt River Mining Company. Mr. Wm. B. Fisher, the well-known California mining man, is now making a careful examination of the property of the company, and the development of the mines, which will be vigorous and extensive, will probably be made under his direction. The "M. W." mine, lately purchased from J. F. Watson by A. G. Ellis, has been transferred to the company. Mr. M. J. Sweeney, who was sent to Burnt River by the Hendy Iron Works, of San Francisco, passed through Portland on his way home. Being asked to express his opinion as to the value of the company's property, he said: "Any of your mines on Gold Hill are good enough to boom the best camp in California. I'll take what stock I can pay for and advise my friends to do the same. You've got the stuff, lots of it, and it's very easy to get at. If you have a good mining superintendent and a competent mill man, you ought to be earning good dividends right from the first month's run of the mill." The contractors on the cross-cut tunnel to the Oriental have struck stringers of rich ore, and report that they are within 20 feet of the main ledge. The funds of the company are being expended only for improvements and development.

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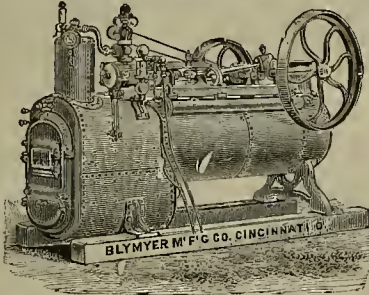
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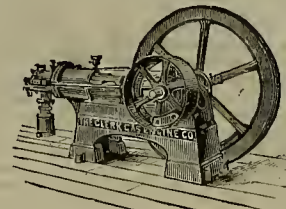
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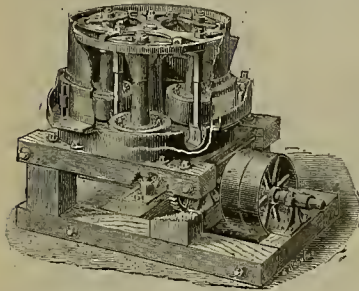
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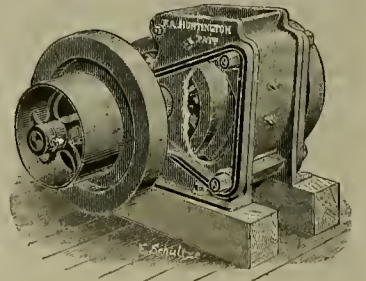
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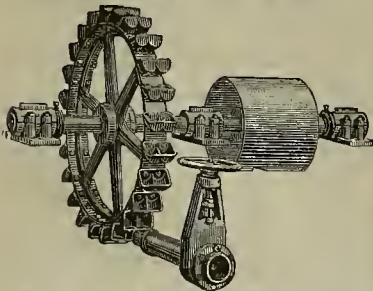
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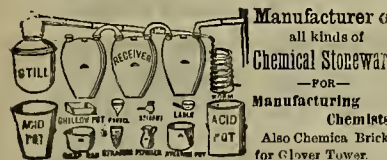
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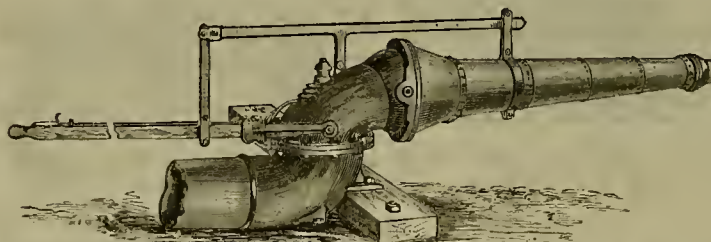
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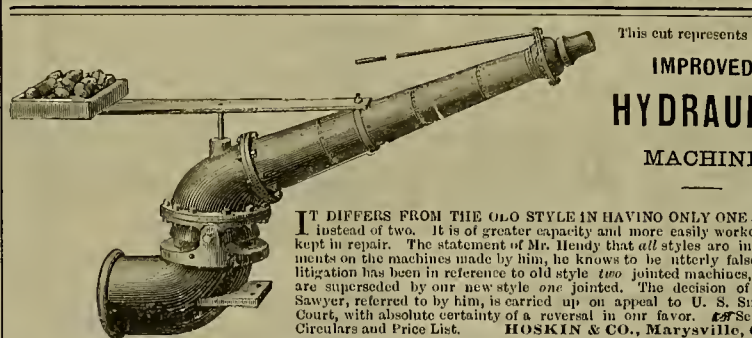
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Court, with absolute certainty of a reversal in our favor. Send for
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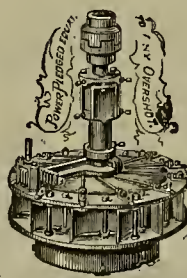
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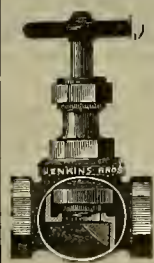
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Manufactured of BEST STEAM METAL. We claim the following advantages over
other Valves and Gate Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impos-
sible to make them tight except by regrinding, which is expensive if done by hand, and if don-
by machine soon wears out the valve, and in most cases they have to be dis- connected from
the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is
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Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MOWING MACHINE.—Benton Elmore, Shasta, Shasta Co. No. 334,762. Dated Jan. 26, 1886. This invention relates to certain improvements in mowing machines, and it consists in certain details of construction difficult to describe clearly, without the aid of engravings.

WASH BOILER.—Gottfrid Bergenheim, South Butte, Sutter Co. The invention relates to that class of wash boilers, in which a vertical passage communicates with the lower portion of the boiler and rises to near its top, whereby a circulation of water is effected. The new boiler consists of a combination of devices, so as to provide a more simple and effective wash boiler of this class.

GATE.—Thomas Depp, Moore's Station, Butte Co., and Edward H. Selby, Marysville, No. 334,516. Dated Jan. 19, 1886. The invention relates to that class of gates which are adapted to be opened and closed by the passing traveler without the necessity of alighting from his vehicle or conveyance, and especially to those gates which, by means of suitably directed ropes by the roadside, have their latches raised and are swung to an open or closed position. There are several novel features in this invention, the object being to provide a simple and effective gate of this class.

GRADING LEVEL.—C. Willganz, Little Stoney, Colusa Co. No. 334,149. Dated Jan. 12, 1886. This surveying instrument is used for determining the grade of land. The invention consists in a stand or tripod, having attached to it a fixed gauge-leg and a plumb, by which the perpendicular between the ground and the top of the stand remains constant, and in a suitable level, supported by a tripod, and having sights upon it, one of which is vertically adjustable for determining accurately the amount of grade necessary for a given work in a certain distance. The object is to provide a surveying instrument, by which the user can readily determine whether one point is lower or higher than another, and the difference between them, and can also accurately indicate and determine the amount of grade necessary for a given work, or for a ditch from one point to another.

Mining Share Market.

Although they have commenced actively pumping the water out of the Osiston shaft of the Gould and Curry and Best and Belcher Companies, on the Comstock, it has not had much effect on the stock market here. The shaft has been repaired and put in good working trim, and its complete drainage to the bottom is merely the matter of a short time, when sinking the shaft deeper for a level corresponding with the 3200 of the Combination shaft will be actively commenced. The sinking of the deep winze below the 3100 level of the Hale and Norcross is also a feature of important interest in the deeper workings of the Comstock. This work has been pushed forward at the very lively rate of about 35 feet per week, and in a few days more will reach the 3200 level. Extraordinary good progress has been made in sinking this important winze, and it will reach its destination, the 3200 level, before the Combination shaft does. The Corliss pump in this shaft has been completed to its connection with the new tank constructed on the 3100 level. The sinking of the shaft for the 3200 level can soon be actively resumed under the most favorable auspices, having only 55 feet further to go to reach that desirable point.

Bullion Shipments.

Richmond Con., Jan. 28, \$19,801; Oro Grande Mill, 30, \$3477; Odessa Mill, 30, \$3720; Koebig's mill, 28, \$500; from French Gulch (for December) \$2000; Moulton, 27, \$11,968; Alice, 27, \$22,214; Lexington, 27, \$23,872; Germania, 24, \$5609; Hanauer, 24, \$7880; Germania, 28, \$5190; Hanauer, 28, \$2600; Germania, 30, \$5151; 31, \$2574; Hanauer, 31, \$3040; Stormont, 31, \$4000. Following were the ore and bullion shipments from Salt Lake City for the week ending Jan. 31: Twenty cars of bullion, 481,494 pounds; seven cars of ore, 106,910 pounds; one car of copper ore, 23,400 pounds.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARVIS C. HOAG—California.
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MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S. M. Co.	Nevada.	33.	25, Feb. 1, Mar. 5.	Mar. 25, W. H. Watson.	302 Montgomery St.
Benton Con. M. Co.	Nevada.	15.	19, Feb. 4, Mar. 1.	Mar. 30, W. H. Watson.	302 Montgomery St.
Best & Belcher M. Co.	Nevada.	33.	59, Jan. 6, Feb. 10.	Mar. 9, W. Willis.	309 Montgomery St.
Belcher Con. M. Co.	California.	3.	30, Dec. 23, Jan. 25.	Feb. 27, J. Connor.	501 Sansome St.
Chollar M. Co.	Nevada.	19.	50, Dec. 30, Feb. 4.	Feb. 16, C. E. Elliott.	309 Montgomery St.
Champion M. Co.	California.	20.	10, Dec. 23, Jan. 21.	Feb. 10, F. H. Weitzel.	522 Montgomery St.
Eureka L. & M. Co.	Arizona.	7.	01, Nov. 28, Jan. 9.	Feb. 8, C. E. Chillet.	628 Montgomery St.
Gould and Curry S. M. Co.	Nevada.	51.	25, Dec. 4, Jan. 8.	Feb. 1, A. K. Darbrow.	309 Montgomery St.
Hathaway Hyd. M. Co.	California.	8.	45, Dec. 8, Jan. 18.	Feb. 8, J. H. Moore.	Montgomery Block
Lady Washington Con. M. Co.	Nevada.	5.	05, Feb. 4, Mar. 2.	Mar. 23, W. H. Watson.	302 Montgomery St.
Manhattan M. Co.	California.	18.	10, Dec. 10, Jan. 12.	Jan. 30, A. B. Brady.	Grass Valley
Nevado M. Co.	Nevada.	14.	30, Jan. 9, Feb. 15.	Mar. 8, J. W. Pew.	310 Pine St.
Pennsylvania Con. M. Co.	California.	3.	01, Dec. 8, Jan. 8.	Jan. 25, M. Byrne Jr.	Grass Valley
Peerless M. Co.	Arizona.	6.	20, Jan. 11, Feb. 12.	Mar. 2, A. Waterman.	309 Montgomery St.
Pearl M. Co.	Arizona.	1.	10, Jan. 11, Feb. 15.	Mar. 6, A. Waterman.	309 Montgomery St.
Pine Tree M. Co.	California.	1.	15, Dec. 22, Jan. 27.	Feb. 15, C. A. Buntington.	309 California St.
Savage M. Co.	Nevada.	65.	50, Jan. 4, Feb. 9.	Mar. 1, E. B. Holmes.	309 Montgomery St.
Sierra Nevada M. Co.	Nevada.	84.	25, Jan. 5, Feb. 9.	Mar. 1, E. L. Parker.	309 Montgomery St.
Union Con. M. Co.	Nevada.	32.	25, Jan. 11, Feb. 15.	Mar. 8, J. M. Buntington.	309 California St.
Virginia Creek Hyd. M. Co.	California.	5.	05, Dec. 14, Jan. 19.	Feb. 11, J. M. Quay.	406 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Holmes M. Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	Annual.	Feb. 9
Murphy & S. M. Co.	California.	W. L. Oliver.	328 Montgomery St.	Annual.	Feb. 16

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Caladonia M. Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Jan. 22
Jackson M. Co.	California.	D. Bates.	419 California St.	10.	Oct. 5
Manhattan S. M. Co.	Nevada.	John Crocker.	419 California St.	25.	Jan. 29
Silver King M. Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Feb. 15
Syndicate M. Co.	Nevada.	J. Stadfeld Jr.	419 California St.	10.	Dec. 24

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.				Red Bluff.				Sacramento.				S. Francisco.				Los Angeles.				San Diego.			
	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.
Jan. 27-Feb. 3.																								
Thursday.....	.08	47	S	Cy.	.00	57	N	Fr.	.00	54	NW	Cl.	—	53	E	Fy.	.00	63	SE	Cl.	.10	64	N	Cl.
Friday.....	.77	56	SW	Oy.	.00	58	SW	Cl.	.00	52	S	Cy.	—	52	N	Fy.	.00	73	E	Cl.	.00	71	NW	Cl.
Saturday.....	.06	48	W	Cy.	.00	51	S	Fy.	.00	50	SW	Fy.	.00	54	N	Fy.	.00	72	SE	Cl.	.03	71	NW	Cl.
Sunday.....	.94	44	NW	LR.	.00	52	E	Cl.	.00	49	SE	Cy.	—	52	E	Fy.	.00	72	S	Cl.	.00	67	W	Cl.
Monday.....	.50	44	O	Cy.	.00	56	N	Cy.	.00	51	NW	Cy.	.00	63	NE	Cl.	.00	65	SE	Fr.	.00	61	SW	Fy.
Tuesday.....	.22	54	S	Cy.	.00	53	NW	Fr.	.00	53	NW	Cy.	.00	56	NE	Fy.	.00	65	SW	Cl.	.00	59	W	Fr.
Wednesday.....	.03	53	S	Cy.	.00	57	S	Cy.	.00	52	NW	Cl.	.00	61	N	Cl.	.00	73	E	Cl.	—	—	—	—
Totals.....	2.69				.00				.00				—				.00				.00			

EXPLANATION.—Cl. for clear; Cy. cloudy; Fr. fair; Fy. foggy; — indicates too small to measure. Temperature Wind and weather at 12:00 m. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 4.	WEEK ENDING Jan. 11.	WEEK ENDING Jan. 18.	WEEK ENDING Jan. 25.
Alpha.....	.30	.30	.35	.30
Alta.....	.15	.25	.30	.25
Andes.....	.20	.20	.20	.15
Belcher.....	1.05	1.10	1.00	1.05
Belling.....	.75	1.05	.80	.60
Best & Belcher.....	.25	.30	.25	.25
Bullion.....	.25	.30	.25	.25
Chollar.....	.15	.15	.15	.15
Champion.....	.15	.15	.15	.15
Confidence.....	.15	.15	.15	.15
Con. Imperial.....	1.60	2.25	1.90	2.10
Con. Pacific.....	.45	.55	.40	.50
Crown Point.....	.70	.75	.80	.90
Day.....	.70	1.30	1.15	2.50
Eureka Tunnel.....	.10	.15	.15	.15
Excelsior.....	.70	.75	.75	.80
Gould & Curry.....	.70	.75	.75	.80
Goodshaw.....	.10	.10	.10	.10
Hale & Norcross.....	1.60	2.50	2.15	2.50
Holmes.....	.10	.10	.10	.10
Independence.....	.10	.10	.10	.10
Julia.....	.10	.10	.10	.10
Justice.....	.10	.10	.10	.10
Martin White.....	.10	.10	.10	.10
Mono.....	3.75	5.00	4.75	4.20
Mexican.....	.45	.45	.40	.35
Mt. Diablo.....	.10	.10	.10	.10
Northern Belle.....	.10	.10	.10	.10
Navajo.....	.10	.10	.10	.10
North Belle Isle.....	.10	.10	.10	.10
Ophir.....	.55	.75	.60	.70
Overman.....	.35	.40	.35	.40
Potosi.....	.35	.40	.35	.40
Pinal Con.....	.60	.60	.60	.70
Savage.....	.60	.60	.60	.70
Seg. Belcher.....	.40	.50	.25	.45
Silver Nevada.....	.05	.05	.05	.05
Silver Hill.....	.05	.05	.05	.05
Silver King.....	.05	.05	.05	.05
Scorpion.....	.05	.05	.05	.05
Syndicate.....	.15	.15	.15	.15
Toga.....	.25	.40	.25	.20
Union Con.....	.25	.40	.25	.20
Utah.....	.20	1.00	.95	1.05
Yellow Jacket.....	.20	1.00	.95	1.05

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Feb. 4.	80 Mexican.....	350 Mono.....	3.75
100 Alta.....	500 Navajo.....	100 Overman.....	15c
200 Belcher.....	1.00	600 Ophir.....	55c
320 B. & Belcher.....	.75c	100 Peerless.....	20c
525 Bodie Con.....	1.50c	100 Peerless.....	20c
320 Chollar.....	.75c	100 Peerless.....	20c
150 Con. Pacific.....	.30c	430 Savage.....	1.05c
650 Con Va. & Cal.....	2.50c	150 Sierra Nevada.....	.40c
100 Goodshaw.....	.25c	100 Union Con.....	.30c
500 Gould & Curry.....	.80c	50 Utah.....	.65c
250 Hale & Nor.....	.35c	200 Yellow Jacket.....	.55c

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

MINING on some of the bars of Snake river is said to be progressing with profitable results.

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Feb. 4, 1886.	
ANTIMONY—Per pound.....	12 @
Hallet's.....	13 @
Cookson's.....	13 @
BORAX—Refined.....	54 @
IRON—Glenagrock ton.....	23 00 @
English ton.....	22 00 @
American Soft, ton.....	24 00 @
Oregon Pig, ton.....	22 00 @
Clippings Cap. Nos. 1 & 4.....	22 00 @
Clay Lane White.....	24 00 @
Shotts, No. 1.....	24 00 @
STEEL—English, lb.....	16 @
Black Diamond, ordinary sizes.....	13 @
Flow.....	8 @
Machinery.....	8 @
Sanderson Bros.....	13 @
COPPER—	
Braziers sizes.....	20 @
Fire-box sheets.....	20 @
Bolt.....	12 @
Yellow Metal.....	12 @
Ingot.....	12 @
LEAD—Pig.....	4 @
Bar.....	7 @
Pipe.....	8 @
Sheet.....	1 85 @
Shot, discount 10% on 500 bag Drop, 7 bag.....	2 05 @
Buck, 8 bag.....	2 25 @
Chilled, do.....	2 25 @
ZINC—German.....	7 1/2 @
Sheet, 7 1/2 to 10 E. less the cash.....	32 50 @
QUICKSILVER—By the flask.....	1 05 @
Flasks, new.....	85 @
Flasks, old.....	5 15 @
Tinplate—Coke.....	6 15 @
Charcoal.....	6 15 @
NEW YORK PRICES—	
California Borax.....	72 @
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Pine Tree Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Summit Mining District, Kern County, California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 22nd day of December, 1885, the several amounts set opposite the names of the respective shareholders, as follows:

NAMES.	No.	Certificate.	Shares.	Amount.
Bennet, C.....	9	1,000	\$ 150 00	
Criswald, A. H.....	10	1,000	150 00	
Criswald, A. H.....	13	1,000	160 00	
Criswald, A. H.....	14	1,000	150 00	
Criswald, A. H.....	16	500	75 00	
Criswald, A. H.....	65	500	75 00	
Criswald, A. H.....	66	250	37 50	
Criswald, A. H.....	67	250	37 50	
Criswald, Mrs. A. H.....	8	1,000	150 00	
Criswald, Wm.....	17	500	75 00	
Criswald, M.....	18	500	75 00	
Criswald, Harriet B.....	19	500	75 00	
Wilson, W. C.....	7	20,000	3,000 00	
Wilson, W. C.....	20	1,000	150 00	
Wilson, W. C.....	21	1,000	160 00	
Wilson, W. C.....	22	1,000	150 00	
Wilson, W. C.....	23	1,000	150 00	
Wilson, W. C.....	24	1,000	150 00	
Wilson, W. C.....	25	1,000	150 00	
Wilson, W. C.....	26	1,000	150 00	
Wilson, W. C.....	28	500	75 00	
Wilson, W. C.....	29	500	75 00	
Wilson, W. C.....	30	500	75 00	
Wilson, W. C.....	31	100	15 00	
Wilson, W. C.....	32	100	15 00	
Wilson, W. C.....	33	100	15 00	
Wilson, W. C.....	34	100	15 00	
Wilson, W. C.....	35	100	15 00	
Wilson, W. C.....	36	100	15 00	
Wilson, W. C.....	37	100	15 00	
Wilson, W. C.....	38	100	15 00	
Wilson, W. C.....	39	100	15 00	
Wilson, W. C.....	40	100	15 00	

And in accordance with law, and an order of the Board of Directors, made on the 22nd day of December, 1885, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Company, room 4, No. 309 California street, San Francisco, California, on Monday, the 15th day of February, 1886, at the hour of 2 p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising

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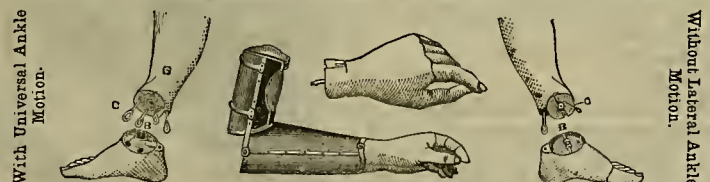
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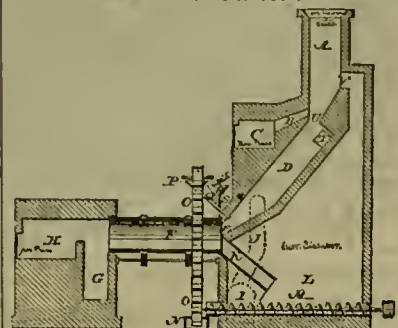
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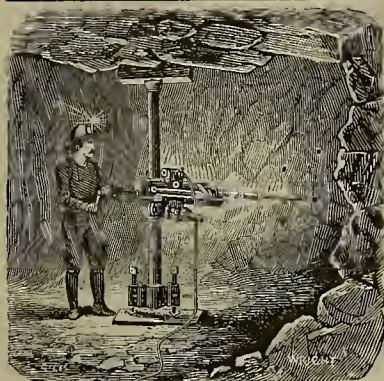
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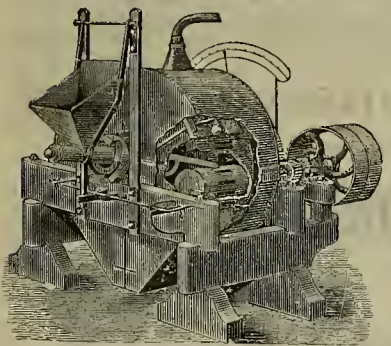
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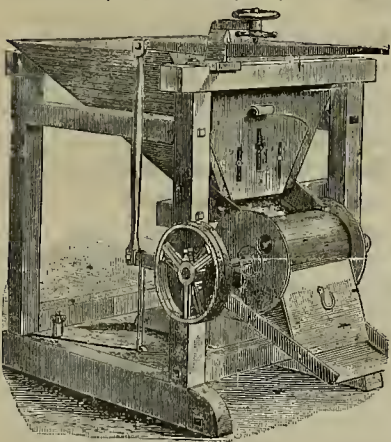


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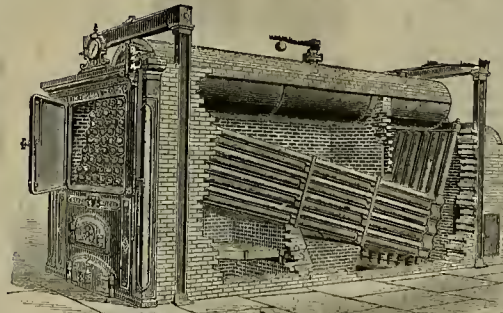
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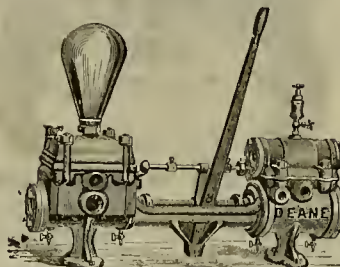
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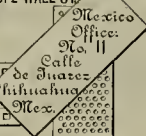
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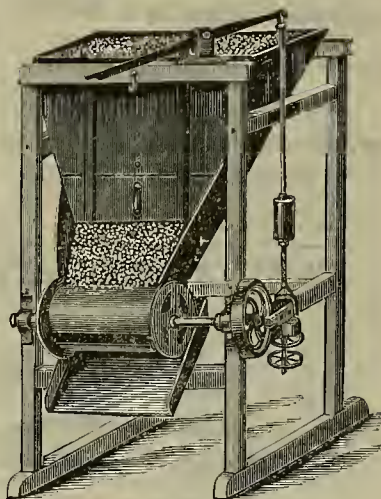
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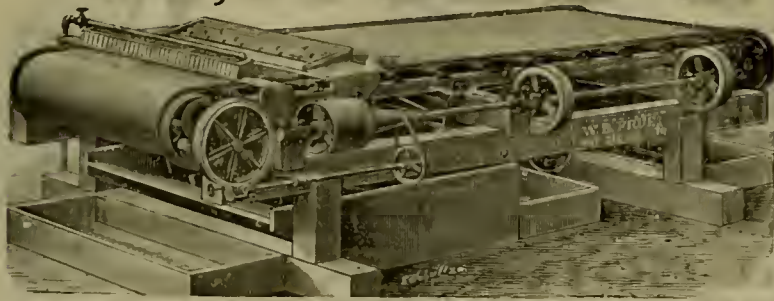
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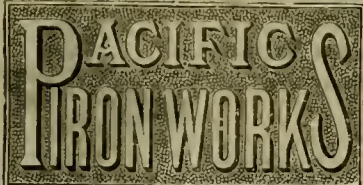
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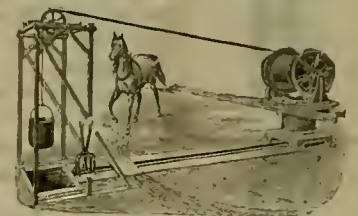
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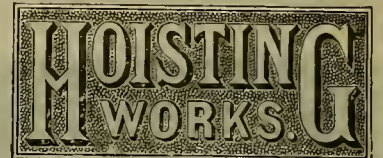
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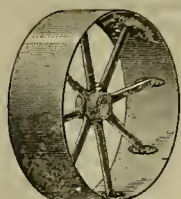
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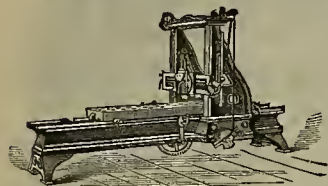
The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 3, 1885.] The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

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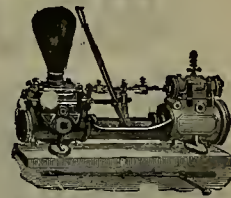
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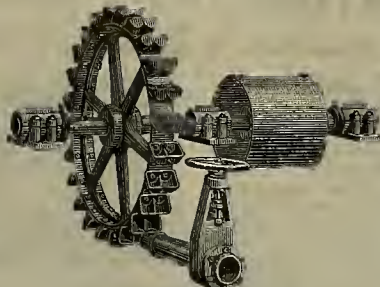
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, FEBRUARY 13, 1886.

VOLUME LII
Number 7.

Aid for Boys and Girls.

The engraving on this page represents the new building of the Boys' and Girls' Aid Society of this city. This society is the only organized enterprise west of the Rocky mountains, whose exclusive work represents the most advanced thought of the age, on the treatment of dependent and erring children. Education in the family, individualization (Natura's process) as opposed to institutional machinery (mechanical measures), are its central ideas, based on the truth that "it is wiser and less expensive to save children than to punish criminals."

The Boys' and Girls' Aid Society was organized in 1874, to pursue in this city and State the methods of child-saving, so strikingly successful in New York City, in the case of the Children's Aid Society. With that conspicuous model before it, modifying its efforts as required by the changed conditions here, the Aid Society has quietly and steadily kept to the work. It has never received a support adequate to its needs, but neither has it ever been without firm and generous friends, full of faith in the value of its work, and determined that it should live till it demonstrated to the community its necessity, and compelled a respect that should insure its proper support. The society rescues homeless, neglected or abused children of California, and receives juvenile offenders (by legal commitment or otherwise), who are in danger of being sent to prison (see annual report, for Probation Law and Form of Commitment); provides for such until suitable homes, or employment and guardianship are found for them, and continues a systematic oversight of their condition and treatment; maintains a day school, a sewing school, reading-rooms, library, baths, and a class in music. Lodging and board are furnished at a nominal charge to working boys and girls, who are without homes in the city. The work is absolutely free from sectarianism, and depends upon voluntary contributions for its support.

The engraving shows the exterior of the main building for the new home of the Aid Society. It was planned by Mr. Clinton Day, architect, and was the gift of Mr. Charles Crocker. Mr. J. G. Fair donated the lot on which the building is to stand, and the late Mr. Sharon donated \$4000 to assist the cause.

This main building is planned to hold about 120 boys, properly classified as to age and condition. On the ground floor will be a main dining-room, officers' dining-room, kitchen, store-

room, pantries, closets, coal room, bath room for boys, with large circular tank, lavatory and workshop.

The first story contains offices, parlor, large assembly (and school) room, two or three bedrooms, a bath-room, and two dormitories where the girls will sleep till the "girls' building" is donated.

The second story is divided into dormitories, with officers' rooms communicating in such way that one officer overlooks two dormitories. In addition there is a bath room, two "lock-ups"

The Mechanics' Institute Fair.

The preliminary announcement of the 21st exhibition of the Mechanics' Institute has been made. It will be held in this city, commencing August 24th, and closing September 25, 1886.

The management have determined to use their utmost endeavor to make this occasion a memorable one, and worthy of the manhood ushered in at this auspicious time. The advantages of this city, to the producer, manufacturer and State at large, for a comprehensive

Aluminium.

A private letter from Kern county informs us of the discovery of a deposit of very pure sulphur. Close to it a metal has been found which they suppose to be aluminium, and which will shortly be prospected. This discovery is on the oil belt. We are asked by the correspondent referred to, concerning the value of aluminium.

The useful properties of aluminium are becoming better known than formerly, and considerable interest is manifested in the prospect of

the manufacture of the metal. It can be used to make wire, pens, pencil cases, railway carriage fittings, locks, bolts, barnes furniture, chandeliers, cutlery, ships' fittings, instruments, etc.

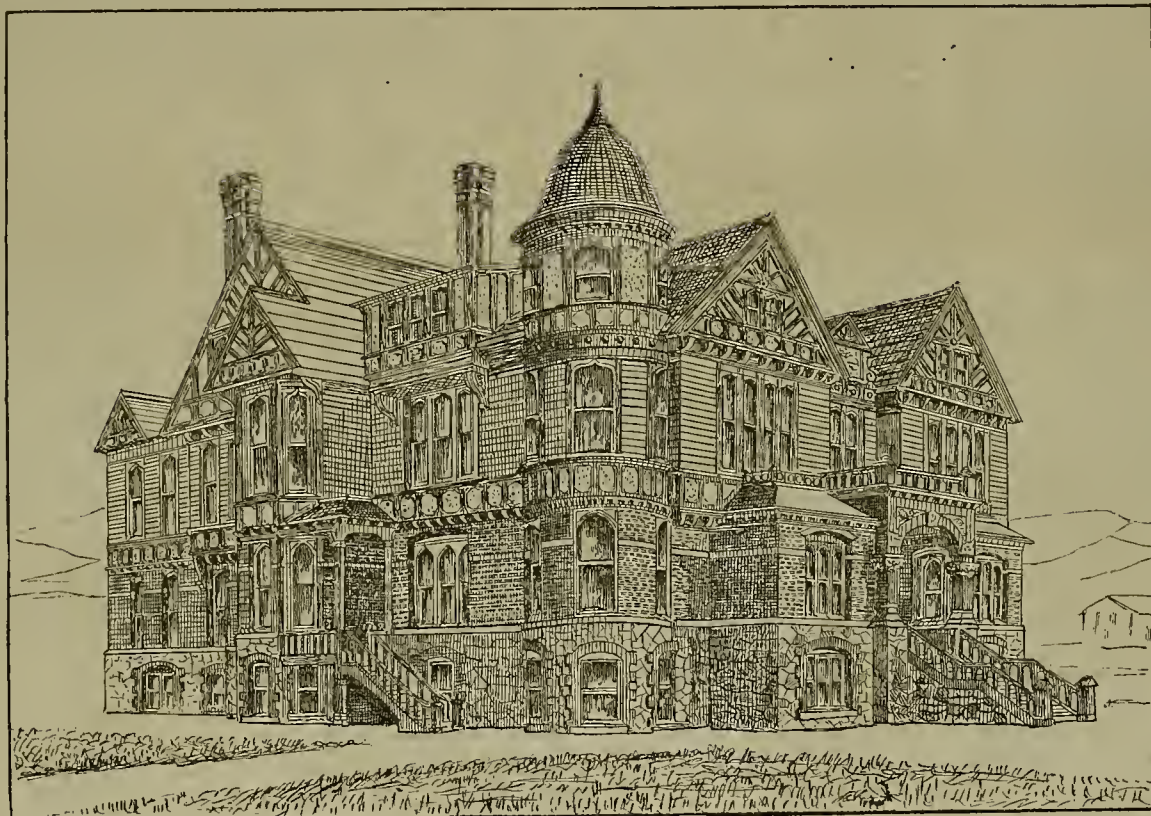
Aluminium is coming into use in the manufacture of alloys, such as aluminium bronze. In this country it is being more extensively used in making the lighter parts of such instruments as galvanometers, and other physical instruments used in scientific experiments, for delicate weights, suture wire, and in engineering, astronomical, and optical instruments. It is sold as leaf, in books, like gold leaf for decorators, at from 40 to 50 cents per book, and is being experimented with by makers of jewelry. Its use is extending slowly, its cost being the principal obstacle.

The price of American aluminium ranged from 75 cents to \$1 per ounce troy in 1883, and \$1 per ounce in 1884, according to quality. It was formerly worth \$1.25. In 1884 the imports were 554 pounds avoirdupois, valued at \$7463.

Until recently the aluminium sold in the United States was all of foreign origin, but it is produced in this country, by a process patented by Wm. Frisbuth, of Philadelphia, who turned out 1000 ounces in 1883, and 1800 ounces in 1884. The aluminium cap or apex of the Washington monument was cast by this gentleman. It is of pyramidal form, is about 10 inches high, its base is six inches on a side, and it weighs 100 ounces.

The small mines and mills in Six-mile Canyon and Gold Canyon and also the main mills on Carson river are all in good working condition, having perfectly recovered from the rough setbacks experienced from the late storm and resultant floods.

GEORGE W. SMILEY, for a number of years caller at the San Francisco Stock Exchange, and well known to mining men on this coast, died in London last week.



NEW BUILDING OF THE BOYS' AND GIRLS' AID SOCIETY.

and a sick-room. The third story, or attic, is not divided at present, although it is to be finished like the rest of the building.

The lot is near the park entrance, and some six feet above grade, which will admit of a good terrace and room for flowers and vines. This will be kept in order by the boys, who will be taught by a good gardener employed for the purpose.

It will be seen that in providing a "workshop" the question of manual labor has been considered. There will be a competent shop supervisor, able to teach the boys simple mechanics. It is not the policy of the society to keep children long enough to learn a trade, but they can begin learning the principles of mechanics and use of their hands.

The girls of eleven and over will be taught by a skilled seamstress both hand and machine work.

The gift of Mr. Crocker is the principal one of three buildings (the others yet to be provided for). The society is doing a good work, and after a long struggle is coming into more prominence, so that it will doubtless receive further gifts.

general display at one time and place, of all the products that are making our name famous throughout the world, must be apparent to every thinking mind, and particularly that when the Grand Army of the Republic, and the largest influx of strangers yet known on this coast will be here, to partake of our hospitality, and to seek information about all that pertains to the Pacific Coast.

The finest products of the husbandman, the best work of the skilled mechanic, and the happiest effort of the artist should be prepared and presented on this occasion, and the management is specially desirous that the various portions of the State be represented by counties or individuals, and to that end will furnish every facility and convenience for the proper display and care of goods, and have decided to offer liberal premiums to exhibitors.

The Mechanics' Pavilion, that now has an area of floor space of over 158,000 square feet, will be still further enlarged and refitted for this exhibition. The premium list is being prepared, and, with the rules and regulations will be ready for distribution at an early day,

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Butte, Montana.

[By Our Traveling Correspondent, R. G. HUSTON.]

Butte City, Montana, the silver and copper metropolis of the Union, is located in Silver Bow county, near a creek bearing the county name, 104 miles southwest of Helena, and some 400 miles north of Ogden. Communication with the outside world is carried on via the Utah Northern railroad, which connects at the northern terminus, Garrison, 45 miles from Butte, with the Northern Pacific and at its southern terminus with the Union Pacific and Central Pacific railways.

The town is scattered over a southern slope of a spur of the main Rocky mountain range. The site was originally located for placer mining some 21 years ago, and was at that time chiefly noted for the poor quality of the gold dust extracted here, it only being worth \$8 or \$10 per ounce, all the other placer gold taken out in this territory being worth double that amount. The altitude is nearly 6000 feet above sea level, being close up to the main range, only a few miles from where the waters of the continent agree to disagree, and pursue opposite directions. Silver Bow valley spreads out into quite a beautiful little valley here, and bears off to the southward for some miles, and is then lost in the mountains in which the creek heads.

For years and until Feb. 1881, Butte was in Deer Lodge county, but at the above time by an act of the Territorial Legislature, the county of Silver Bow was cut off from the southern part of Deer Lodge and Butte as a matter of course was chosen as her county seat.

The new county started in with an assessed valuation of \$4,000,000 and in four years has very nearly doubled, the assessment of 1885 showing \$7,546,781. The population was then some nine or ten thousand, and now Butte claims 21,000. This, of course, includes the villages of Walkerville, Meaderville and the station and they are virtually one, as they are in a manner built up from one to the other.

The Growth of the Town

Has truly been phenomenal and can only be accounted for by the large amounts of money disbursed by the different mines for labor and supplies that required labor to procure. Many leads were discovered during the first years of the placer mining here, but they were of a character of ore of which but little was known, and were not much thought of.

A quartz mill was put up here in 1867 by Mr. Chas. Hendrie, but owing to the fact that the mill was for saving gold and the ore they produced to treat carried a preponderance of silver, the enterprise failed and for years the mill was shut down. It was afterwards purchased by Judge A. J. Davis and remodeled into a silver mill, and is yet treating silver ore successfully, and known as the old Lexington mill.

Late in 1875 John Howe, one of Montana's early pioneers, erected the Centennial mill, and early in 1876 commenced the first successful treatment of ores in Butte, and from this date the town began to grow. It still continues and from the present appearance of the different mines, the depth to which they have been tested, the immense size of a number of them, and the number of other properties being prospected that are showing up to be permanent paying properties, I would not be surprised to know that at the end of another year the population had increased to 30,000.

Previous to this time a number of parties had selected ore and shipped it East for treatment; but, of course, the high rates of freight must have consumed most of the product of these shipments. This Territory is now producing more than one-fifth of the world's product of copper. The worth in dollars of the copper produced from the Butte mines for 1885, was \$8,500,000, the silver \$6,750,000; the total placing Butte a long way in the lead for precious metals for the year just ended.

The Outlook

From my impression, is that the year 1886 will far exceed any previous one in volume of product, and consequently in general prosperity. Many new mines have been opened and are ready, or will be, by the opening of spring, to take out ore, and as there are custom mills and smelters both here, there will be no trouble in getting their ore worked and satisfactory results obtained.

Also many of the old regular producers have so increased their capacity that their product will be largely increased and the output of the camp correspondingly increased.

The freight receipts via the Utah Northern Railroad will probably give an outside party a better idea of the magnitude of the business of the town than anything else I can give them. For the year ending Jan. 1, 1886, the freight receipts were nearly 230,000 tons and the freight forwarded was 235,000 tons; this of course was nearly all bullion and copper matte.

The city incorporated in 1879, and is governed by the usual mayor and aldermen that look after the welfare of corporations of that kind,

and her various interests are carefully looked after and law and order maintained in the fullest sense of the word. The circulation of so much coin every month among the masses naturally attracts an army of adventurers, and amongst them rascals in a great plenty; but there are very few cases of robbery or violence to dispose of, and in fact, it is about as orderly, and life is safer here than in the Bay City, and when we consider that we have here a motley crowd of the rougher element gathered in from all the different mining camps from Mexico to Alaska, it is certainly wonderful that peace and quiet reign supreme.

Butte Is Well Supplied

With all the modern improvements of the age. First of all, it is supplied with electric light by an incorporated company, who have a magnificent plant and sufficient capacity to meet the demands of the rapidly-increasing population. By a contract with the City Council, they supply 11 masts in different parts of the city, so that the helated traveler need experience no inconvenience from dark streets. The tower on the courthouse is furnished with four arc lights of 2000 candle-power, and looms up like a star in the distance, particularly to a stranger coming into town through the valley at night, as I did. These lights are at an elevation of 150 feet above terra firma.

The courthouse is or should be the special pride of the residents of Butte, for it would certainly do credit to a much older city. It was erected at a cost of \$150,000, and is a good example of the enterprise and spirit of men in these mountain towns. Whilst at the time, I understand, the conservative portion of them did not fall in with the idea, it will, I think, ultimately prove just what they wanted, as it gives them ample room and no doubt will for all time to come. It is well and substantially built of brick, iron, white sandstone and granite, and in the matter of architectural beauty is certainly not lacking in any particular.

It is two stories in height, and surmounted by a large tower running up to the height of 150 feet. The upper story is lighted by gas, the lower by incandescent lights, and is strictly a "modern improvement" building.

The county jail is in the rear and connected by a passage way, and is also substantially built and equipped with Pauley's patent cells of chilled iron and steel, safety locks inclosed in iron boxes, has a capacity of 64 prisoners, and from the close proximity of the Territorial penitentiary that it is probably as much room as they will ever need to serve the ends of justice and correction.

The Butte gaslight and coke company is another of her live enterprises, with \$100,000 paid up capital. They have a fine plant, present capacity about 50,000 cubic feet per day, and are prepared to increase it whenever the needs demand.

The Silver Bow Water Company supply the place with good water from a mountain stream which is hrought some eight miles in a covered ditch, which is compulsory on account of the climate. This is reservoir on the hill above town, and affords them ample pressure in case of fire. So complete is this part of the arrangement, that the city authorities sold their steam fire engine to the Helena people because they had no use for it.

The wants of the weary traveler are ably looked after by Messrs. Baker and Foster of the Saint Nicholas hotel, and Dr. Beall of the Centennial hotel. I have heard that a movement is on foot to incorporate a company and build a fine hotel on the present site of the Centennial, and it looks like a paying scheme, for Helena with less than half the population supports three first class hotels, and I can see no reason why Butte should not do as well.

The town has been visited by fire three times since my arrival here, but they have a very efficient fire department and they soon get the best of it.

Mineral Lodes.

Continued from our last.

After mature reflection the court is unable to see any reason for changing the conclusions it then announced, and it will be governed by the principles enunciated in determining this case. This, of course, leaves the question to be decided mainly one of fact.

The mines in controversy are situated in a low group of mountains, one of that type of small mountain ranges so common in the Great Basin between the Wasatch and Sierra Nevada mountain ranges. The town of Eureka is located in a gulch or gully between two hills or ranges, which extend easterly and westerly. Running northerly from the southern range is a spur of the mountain, which declines quite rapidly to the town below. North of the town the northern range of hills rises quite precipitously. The Eureka and Montana mines are located along the spurs just mentioned, their course being northerly and southerly. From the southern end of the Eureka claim the outcrop or apex is clearly visible, until within 750 feet of the northern end line, where a point is reached where the rock has been eroded away and covered by debris and wash to the depth of from 100 to 125 feet. It is over this wash that the town is built, and it is underneath the wash that the greatest crushing and breaking of the lime rock has occurred and the complications been produced by nature, which have occasioned this litigation.

The Bullion claim, No. 76, adjoins the Eureka

on the west, and is located over the wash to the east of the vein. There is an extensive

Area of Intrusive Rock.

Called by the miners porphyry. Next adjoining that is a broad belt of magnesian limestone. Going with the magnesian limestone there is a narrow belt, somewhat irregular, of thin bedded limestone and shales, more or less calcareous and more or less silicious. Bounding this limestone on the west is a broad and extensive belt of quartzite. The mines in question are found in the limestone formations. These are rocks of sedimentary origin. Their original position was flat, or horizontal. Subsequent dynamic disturbances have altered their original position. They have been raised up—tilted up; have been cut apart, and the basic edges of the strata are in many places visible on the surface. The position of the lime beds at Eureka is now nearly vertical. In some places they dip slightly from the vertical line to the west, and in other places, especially in the southern portion of the mountain south of Eureka Hill, dipping to the east. At the time the lime beds were uplifted they were extensively faulted, on the line of what is called the main fault, or 24 fissure. This great fissure runs through the rock underneath the wash and has caused the beds to bend or buckle, turning them sharply to the west and causing more brecciation than in other portions of the mine.

The ground is more or less broken and fissured from end to end. There are a large number of cross-fissures, and there are several that run north and south with the bedding. Some of these fissures show lines of motion and quite high polish on their walls. Two in particular, which have during the case been called the east and west fissures

Show Clearly Defined Lines of Striation

In many places, and at some points exhibit beautifully polished walls. It is conceded by all the witnesses that the rocks were crushed, rent and fissured before the period of vein formation. It is admitted by all that the precious metals came up from below in solution, in the form of mineralized waters, through openings in the rock, and were deposited where we find them to day.

The Conflicting Claims.

The Eureka Company contends that the ore found in the claims is one broad lode which is wider than the side lines of the Eureka toward its northern end, and extends into the Bullion. On the other hand the Bullion Company claims that there are two veins or lodes. That the two longitudinal fissures, called the east and west fissures, to which the court has called attention, are the east and west veins. It claims that the precious metals were brought up from below through these fissures and no others, and that they are divided by a clearly defined boundary of mineralized country rock. It also claims that the west vein passes entirely without the side lines of the Eureka and becomes the Bullion lode. These are the conflicting claims of the parties upon the facts, and this is the issue the court must decide.

The Question

May perhaps be stated more intelligently as follows:

First—Is there one broad lode, or are there two veins?

Second—If there are two veins, does the west vein pass without the side lines of the Eureka?

Much may be advanced in favor of either theory. In fact, this is a case in which men may honestly differ. The court can only determine it by the preponderance of the evidence. Upon the one hand it is contended that the limestones at Eureka are more or less dolomitic, containing carbonate of lime and carbonate of magnesia. It is said that the carbonate of lime is more readily soluble in waters containing free carbonic acid than is the carbonate of magnesia, and that waters charged with free carbonic acid would erode, eat out and alter the dolomite. That irregular caverns or chambers would be formed, and that the mineralized waters coming from below through numerous fissures, would deposit their minerals

In Irregular Bodies.

With but little reference to the fissures. On the other hand, it is urged that while it is true the ore is not found within the walls of fissures, yet that it is deposited through the agency of fissures, and that all the ore bodies will be found to connect with either the east or the west fissure, and that the two lines of ore bodies are clearly separate and distinct.

What makes the question harder for the determination of the court than it would otherwise be, is the fact that there are no well defined boundaries to the ore bodies. This ore is deposited with that irregularity and uncertainty that we must expect in limestone deposits, where, as in this case, there is not found as yet either a foot wall or a hanging-wall.

The court is unable to accept the argument of counsel for the Bullion, that the east and west fissures are the east and west veins, and that where the west fissure crosses the west line of the Eureka, the vein crosses. The court is unable to adopt this theory, because there is no ore found in the fissure; but there is ore found each side of it and sometimes a long way from it. To whom do these ore bodies belong? The fissure itself is substantially barren. It may have brought mineralized solutions from the great source below, but it was merely the channel through which the waters flowed.

However, in the view which the court takes of this case, it is unnecessary to determine whether there are two veins or one broad lode. The ore bodies on the west side of the Eureka claim are said by the Bullion to have been deposited through this agency of the west fissure. The court does not think that

A Barren Crack in the Earth

Is a vein or lode, within the meaning of the law, and hence it cannot bold that where the fissure crosses the west line of the Eureka the vein crosses. This simplifies matters, and narrows the inquiry to the question as to whether the line of ore bodies upon which the Eureka discovery is located passes outside the side lines of the Eureka. The testimony shows that it does not.

The Ore Bodies of the Eureka

Are within its side lines up to a point westerly of and about opposite the Eureka main shaft. Here the wash begins to be encountered in depth, and here, owing to the buckling, breaking and turning of the lime beds, the ore bodies are turned towards the west and cover a much greater space in width than they do further south, but the Eureka lode has its apex underneath the wash, and does not depart from the claim. It is broader and its course seems to be more westerly. But large ore bodies are found in the north and south center drifts, in the court raise, in the Dower stope and at other points, and their connection with the ore bodies further west is plainly shown. The mineralization found throughout the northwest and southwest tracing drifts, through the north and south center drifts, in the McMyrtle raise, the Dower stope, the Henderson drift, and the ore bodies found west of the Eureka west line, came from the same source, are impressed by the same forms, and appear to have been created by the same processes.—The Eureka case, 4 Saw., 312. In other words, they are one and the same lode.

I have already called attention to the fact that so far as the Eureka lode outcrops at the surface or can be disclosed by ordinary surface explorations, as defined by the witnesses on the trial, the Eureka location follows the course or strike of the lode. The point where

The Ore Bodies

Curve westerly and the lode becomes wider than the side lines is upwards of one hundred feet beneath the wash. The question therefore arises whether, if a locator follows the course or strike of the lode in making his location, so far as it is indicated by the surface outcrop or surface exploration, the law will not presume his location to be laid along the lode for the entire distance to which he is entitled by the statute. The law does not require impossibilities. It does not require a man, when making his location, to make explorations a hundred feet or more beneath the surface. It simply requires him to act in good faith; and if, in good faith, he follows the lode so far as he can by surface indications and surface explorations, he should not be cheated out of his property because, a hundred feet beneath the wash, a great convulsion of nature has caused his vein to pass partly outside his side lines. With regard to

The Location of Mining Claims

The Supreme Court of the United States has said that the most practicable rule is to regard the course of the vein as that which is indicated by surface outcrop, or surface explorations and workings.—Flagstaff case, 98 U. S., 460. In this case the location followed those indications. The law says he is entitled to a certain number of feet of the lode. Is it fair to say that he shall not have them because, after having followed the outcrop and laid his claim upon the course of the lode, so far as he could gain any knowledge of the same, he finds that the heads of lime beneath the surface are so bent to the west that a portion of the ore bodies lie outside his lines?

I have suggested these matters as indicating that it is but simple justice that the Eureka

Should Have Its Lode

In its entire length. The Bullion did not know that there was any ore within its claim, No. 76, until about the time the suit was commenced. It was discovered then, by sinking a shaft, after making a survey of the Eureka's workings. The Bullion discovery is on claim No. 68. Claim No. 76 was segregated from 68, and was thought to be of but little value. I am pleased to feel that the facts do not require me to do any injustice in determining this case in favor of the Eureka. The law and the facts enable me to say that the Eureka shall have that to which it was entitled when its location was made. Had the locator of the Eureka seen fit to sink shafts through the wash south of the Eureka main shaft on a line above the north and south center drifts, he would have found as he reached the rock, that the ore apexed within his location from one end to the other. Under such circumstances the court cannot, in reason or in justice, say that the lode passes without the claim.

This disposes of all the questions that it seems necessary to discuss in this opinion. The other questions raised, as well as those I have just considered, are decided in the findings of fact and conclusions of law to be filed in the case.

Judgment must be entered for the plaintiff in the cross action, the Eureka Hill Mining Company, in accordance with the findings.

ORLANDO W. POWERS, Judge.

MECHANICAL PROGRESS.

Triple-Expansion Engines.

The first volume of the "Transactions" of the recently established North-East Coast Institution of Engineers and Shipbuilders, England, contains a paper on "Triple-Expansion Engines," by Mr. Taylor, which is well worth notice. Mr. Taylor was one of the first engineers to make triple-expansion engines a success at sea, and what he has to say on the subject, therefore, claims attention. Mr. Taylor attributes the superior economy of triple-expansion engines to the fact that larger measures of expansion may be used with it without entailing disastrous cylinder condensation than is possible with any other form of engine, and apparently to nothing else. He asserts, also, as do many other engineers, that this result is due to the smallness of the range of temperature in each cylinder. In other words, the triple-expansion engine enables the heat-trap theory to be applied in practice to a greater extent than is practicable with the ordinary compound engine. Referring to this point the London *Engineer* some months ago undertook to prove that the economy of the triple-expansion engine is due to an entirely different cause.

If steam could be used in a cylinder of slate or other material which did not take up or give out heat, remarked our contemporary at the time, it would, according to the accepted basis of thermo-dynamics, behave very nearly like a permanent gas. If it was so far superheated that none of it would be condensed in the performance of work, it would behave precisely like a permanent gas, and the consumption of coal, as compared with the very best engines now running would be reduced by about 25 per cent. This result would be due entirely to this circumstance that there would be no condensation and no re-evaporation in the cylinder. We say "cylinder" advisedly, because no advantage of any kind is the way of economy of fuel could then be derived from the compound principle. The turning movements would be more irregular and the strains more severe, and the valve gear more complex, but with these things we have nothing to do at this moment.

After a technical discussion of the subject, the *Engineer* says: "The practical aspect of the case is that there is some special condition or factor operating to cause cylinder condensation, which is not fully explained by theory. In spite of the advantage apparently gained from the use of more than one cylinder, the fact is that condensation seems to be augmented rather than diminished. There is no obvious reason why as much as 43 per cent of all the steam that enters the high-pressure cylinder of a compound engine should be condensed; but if indicator diagrams tell any truth, the condensation does reach, and even exceeds that point. In Mr. Perkins' triple-expansion engine the condensation reached as much as 47 per cent, although the cylinder was jacketed. In the discussion Mr. Heck called attention to Mr. Seaton's paper read before the Institute of Naval Architects. Mr. Seaton stated that the results which he had obtained from a three-cylinder engine, with steam at from 100 to 110 pounds pressure only, were almost as good as those which he obtained with 160 pounds. Accordingly he had reduced his pressures, and he found that he did just as well with 140 pounds as he did with 180 pounds. This is very important testimony, as Mr. Seaton probably knows as much about triple-expansion engines as any other engineer.

The fact is that the heat-trap action of multi-cylinders has little or nothing to do with the economy of the compound or triple engine. It will suffice to say here that cylinder condensation is not an evil, provided all the condensed steam is re-evaporated under conditions which will permit it to be usefully employed. It is no more an evil than a fly-wheel is an evil; and the triple-expansion engine supplies more facilities for using initially condensed steam to advantage than the simple engine does."

Another number of *Engineering* contains a cut and an elaborate description of a triple-expansion engine of the steamship *Enfield*, the cylinders of which are respectively 21, 35 and 57 inches in diameter with 39 inch stroke and an initial steam pressure of 160 pounds. This engine is said to be performing remarkably well.

Compound Locomotive Engines.

According to the *Locomotive*, there is at present quite a lively discussion among the English technical journals in regard to the economy of compound locomotives. Mr. Webb, the master mechanic of one of the principal English roads, who has been running them for some time, says they have not proved as successful as it was hoped they would, hence some of the writers jump at the conclusion that the principle is wrong and that compounding must be regarded as a failure. An American cotemporary—the *Manufacturer and Builder*—does not think this conclusion is justified by the circumstances of the case, and holds, as a rule, that when a new departure is made in any department of engineering the forms of construction first tried should be modified to overcome difficulties arising in practice such as could not be foreseen. Our cotemporary has made the prediction that compounding will ultimately prove as successful in locomotive practice as it has in marine and stationary practice.

STEEL AND STEEL CASTINGS.—The raw material for the manufacture of wrought-iron and steel, and also for making castings of all kinds, is obtained by the reduction of iron ores in the blast furnace, and is handled under the name of pig-iron, which varies greatly in chemical composition, according to the purpose for which it is intended. Wrought-iron is the refined iron from the pig iron that does not occur in a fluid condition. Steel is the refined metal obtained in a liquid condition, and can be cast in molds, and has one advantage over wrought-iron, by containing a very small amount of oxide of iron and slag. The microscope shows these two deteriorating impurities in large proportions, forming a mechanical mixture with the refined iron. Malleable iron is the same inevitable pig of the required chemical composition, which is first cast in molds, and the castings heated in an oxidizing material that eliminates the excess of carbon that is always found in pig-iron and renders it malleable. It is a matter of controversy whether or not steel was known to the ancients; in our own period it dates back only a hundred years, and Sheffield, England, the home of tool-steel, enjoys the distinction of location. The manufacture of good crucible steel, although largely dependent on manipulation, is due to the material used in it; in other words, good crucible steel cannot be made from inferior material. For the best tool steel the best material is required, and so far none has been found to approach the celebrated brands of Swedish ores for this purpose. By far the greater part of the cost entering any tool is what is paid for labor, and in view of the many mishaps liable to occur, even under the most favorable conditions, the best steel should be used, as it is the most economical in the end, notwithstanding a comparatively slight advance in its cost.

EASTERN COMPETITION IN WROUGHT IRON.—The *Builder and Architect*, of this city, says that the fact that the "box girders" made East and shipped to San Francisco for use in the Union Club building, are strongly suggestive, alike to "wrought-iron workers," owners of property, tradesmen, general dealers and business men. To wrought-iron workers, as suggesting the necessity for more complete and perfect arrangements, machinery and appliances, enabling the handling, shaping and dressing of heavy girders and all other descriptions of works, to advantage, and doing all that can be done in any other part of the United States, as cheaply and as well, barring differences in cost of labor, and even overcoming that to a large extent, if not entirely. A material difficulty in this connection exists in the fact that the number of shops and firms operating in this line are far too numerous for this city, except in extremely brisk times; that while there are two or three fairly equipped establishments, sufficient in appointments to supply all ordinary demands, or, in fact, anything that might be required of them in wrought-iron work, there is no one firm or establishment of comparative "gigantic proportions" capable of taking hold of any work offered and defying all outside competition. The freightage and handling expenses of plate iron in long lengths certainly should not be any greater, if so great, as that of heavy manufactured girders. In this regard, the advantages should be on the side of our local workers, with which, as a fact, leaves all the advantages possessed abroad, in the more complete methods of working, and any difference that may be in labor and incidentals.

METAL IN HOUSE BUILDING.—In the East or in any locality where thunderstorms are frequent, it is suggested by a Philadelphia paper that the metal in the fittings should be reduced to the smallest practical amount. In this connection the following hints are given: Stove pipes, the foils at back of mirrors, gas and water pipes are good conductors of electricity, and one should avoid their neighborhood in a storm. Brick furnaces are better every way than iron ones, and there is so much gain of safety in dispensing with these masses of metal in the house. Gas is a barbarous thing for dwellings anyhow, killing plants and poisoning people, so its pipes may be got rid of. As for water pipes, rubber hose in proper casing will be found to answer well and have the additional advantage of saving plumbers' bills, as it will not freeze in winter. It is argued from a scientific view that the employment of much metal in house building is injurious to the health of inmates, as it interferes with the magnetic current, and that delicate persons condemned to live in buildings with metal roofs, iron stairs, girders, or with a battery of gas and water pipes, steam coils and electric wires about them, infallibly suffer in strength and nerves. Be that as it may, and the view is quoted only as a curiosity, it is certain that low houses, broad rooms, and the least metal about them are safe houses in thunder storms, and all the clatter about modern conveniences, or the ridicule of friends in rugged health, who never knew the quiver of a nerve, will not weigh a feather against the gain in peace of mind in these constantly recurring cries of weather.

THE BEST MACHINERY AND TOOLS.—The *Mechanical World*, of London, says that the United States has the best machinery and tools in the world, and M. Lourdolot, who was recently sent over here by the French Ministry of Commerce, says that the superiority of tools used here, and the attention to details too often neglected in Europe, are elements of danger to European industries.

SCIENTIFIC PROGRESS.

Tracing a Typhoon Around the World.

At the meeting of the Meteorological Society of London, in November last, Mr. Henry Harries read a very interesting paper on the origin and progress of typhoons, in which he made particular mention of a noted phenomenon of this character which traveled, in a zig-zag manner, almost around the world. Its appearance at different points was carefully and, no doubt, correctly traced by numerous observations along its track at meteorological stations on the land, and by the examination of ships' logs which chanced to be in its path across the Indian, Pacific and Atlantic oceans. Probably no typhoon or gale was ever traced over so lengthy a track. We copy from the London *Athenaeum* as follows: The earliest evidence of the formation of the typhoon was on September 27, 1882, some distance east-southeast of Maui, some ten degrees south of Japan. At first the movement was toward northwest, five miles an hour; but on September 30th, when the storm area extended to 1300 miles northwest of the center, it turned toward northeast, crossed the southeastern corner of Japan at 33 miles an hour, and attained a maximum rate of 51 miles per hour on October 2d to 3d, after leaving the Japanese coast. In the neighborhood of the Aleutian Archipelago the progress was very slow until the 9th, when it rapidly increased to 35 miles an hour, and entered Oregon on the 10th. The Rocky mountains proved to be no obstacle to the progress of the typhoon, which crossed the range at 36½ miles an hour, and maintaining this rate passed across the Northern States into Canada. Thence it crossed Hudson bay and Labrador into Davis strait. Altering its course to south of east it passed the southern point of Greenland on October 16th; and two days later, in lat. 55 N., long. 27 W., it was joined by another disturbance, which seems to have formed about October 9th in 20° N., 48 W. The juncture of the two storms was followed by a complete cessation of progressive movement for a week (October 19th to 26th); and during this period there was formed the subsidiary gale which suddenly arrived over our southern counties on the morning of October 24th, completely upsetting the meteorological office forecasts of the previous night. The author quoted several records from ships, which went to show that this secondary storm had not formed until nearly midnight, and that reports from our low-lying stations would not have enabled successful forecasts to be issued before 3 A. M., October 24th. As this gale passed away, the primary moved into the bay of Biscay and entered France on the 27th. As in Japan and America its advance was marked by violent gales and destructive floods over a very extensive area, from Algeria northwards. The damage caused by the floods in England was serious, but trifling compared with the losses in Southern and Central Europe, where the destruction was enormous. This typhoon was the principal contributor in making the month of October, 1882, the worst within living memory. With this final effort it seemed to have expended its fury, and in crossing France and the Netherlands it gradually filled up. The last trace of the typhoon was in the Baltic on November 1st, when it quietly dispersed after covering over 14,000 nautical miles in 36 days—nearly three-quarters of the entire circumference of the earth—and the longest track hitherto followed day by day. This is the first storm which has been followed day by day from the Pacific to Europe.

Meteors and Meteoric Streams.

Much attention has been paid of late years to the study of meteors, and especially to their periodical occurrence in large numbers, or in "streams" or orbits, as has recently been ascertained to be the fact in regard to these periodical appearances. These streams move in orbits more or less eccentric around the sun, and are supposed to represent what were once cometary bodies, now broken up into small particles of matter, streaming along and occupying vast longitudinal areas of space. The asteroids form a stream of a similar character, only less elliptical, not crossing the path of any planet, as the meteors proper do. The asteroids, however, are undoubtedly the fragments of a reared planet, and are much larger in bulk. Probably all meteors are fragments of reared comets or planets, or particles of matter thrown off from planets like their moons, in the early stage of their planetary existence.

Prof. Kirkwood, of Bloomington, Indiana, has recently pointed out, in a paper read before the American Philosophical Society, that a careful discussion of the meteors which have been observed in the middle of November shows that there are three meteoric streams moving in the orbit of the comet of 1866. Of these the principal group is the well-known one which produced the great showers of 1833 and 1866; the period of this was shown by Prof. Adams to be about 33-25 years. Prof. Kirkwood identified the second group in 1875 from an examination of the meteoric observations of Humboldt and of Quetelet; its period is about 33-31 years, and a shower from it will be due about November 14, 1887; but the display may commence about that time next year. The third group has been less observed than either of the others; its period is about 33-19 years, and another shower from it will not be due until 1912 or later. A comet (or rather a pair of comets) was

observed in China in the year 1366, and this is generally supposed to have been an appearance of the comet of 1866 (500 years being very nearly equal to fifteen multiples of 33-25). Prof. Kirkwood suggests that the comet may have undergone a great diminution of brightness in 1366, in consequence of the separation from it that year of the first and largest of these groups.

A Revival of the Bronze Age.

We had in the earlier ages of mankind a rough and polished stone age, a bronze age and an iron age, each distinguished by the character of the material that was predominantly used by men for their weapons and tools, and have now added to these ages one of steel. In a similar manner, we are now entering upon a revival of the bronze age, in which that substance in its varieties is to be put through stages of improvement like those that iron and steel have undergone. Many varieties of bronzes have been produced within the last few years that possess features strongly distinguishing them from the ancient alloys, and some very remarkable qualities as compared with them, in view of which they are frequently used in place of even iron and steel. The bronzes of the ancients were composed of copper and tin, as is also what is now regarded as bronze pure and simple, mixed in proportions varying according to the purpose for which the compound is intended. Other substances, however, are often added, without unclassifying the product, which is still called bronze, provided copper and tin are the chief constituents. Among these substances are zinc, lead, phosphorus, manganese, silicon, iron, nickel, arsenic, antimony and sulphur. It is the addition of certain proportions of one or the other of such substances that constitutes the modern development of bronzes manufacture, and which has given us some of the most useful and at the same time some of the most remarkable alloys known.

These comprise no fewer than eleven distinct products, all of which find their uses in connection with the practice of engineering. They are phosphor bronze, silicon bronze, manganese bronze, delta metal, phosphor copper, phosphor manganese bronze, phosphor lead bronze, phosphor tin, aluminium bronze, silveroid and cobalt bronze. There are also other bronzes which are used as substitutes for gold in cheap imitation jewelry, but they do not come within the scope of this article.—*Manufacturer and Builder*.

THE ORIGIN OF THE AMERICAN DOG.—Dr. A. S. Packard has contributed to the September number of the *American Naturalist*, a paper of universal interest on this origin of American dogs. He concludes that, though the impression that the domestic dog of the Old World has descended from a wild species distinct from the wolf may be well founded, in America, the evidence tends to prove that the Eskimo and other domestic varieties of dogs were domesticated by the aborigines and used by them, long anterior to the discovery of the continent by Europeans,—the varieties in question originating from the gray wolf or the prairie wolf. The subject is fully illustrated by quotations from the accounts of the early explorers. This opinion is supported by the well established fact that the domestic dog, and gray as well as the prairie wolf will hybridize.

USED IN SHOOTING OIL WELLS.—More than one hundred tons of nitro-glycerine were exploded in wells in the Pennsylvania oil fields during October says a Warren correspondent of the *New York Sun*. November, the closing month of the year for active field work has already seen this wonderful record, and will go it at least ten tons better. In the flush days, when the patent was exclusively controlled by the Roberts monopoly, the deadly explosive was measured by the quart, and commanded most exorbitant prices. It then cost a poor man nearly a month's production to have his well shot. Now the smallest producer in the region can afford to dump a barrel or so of the stuff into his well. There are perhaps twenty firms in the country that are piling up fortunes making glycerine.

THE VALUE OF SCIENCE is not in the discipline which it gives the mind, nor in the pleasure which its acquisition conveys, but in the use which can be made thereof. Sooner or later, each scientific fact, quarried from the great ledges, at which men have toiled unceasingly for centuries, becomes of use with special fitness. It may make us better, or wiser, or richer, or stronger or happier or more than one of these; but its great use is sure to come in time, if not at once.—*Grimshaw*.

ARTIFICIAL FORMATION OF IRON ORE.—A curious phenomena is said to have been recently observed, and supposed to have been caused by electricity. In removing a lightning rod which had been imbedded in a clayey earth containing iron in the form of oxides, for about fifteen years, there was found attached to it a lump of iron ore, weighing ninety-six pounds, supposed to have been aggregated by the action of electricity from the surrounding earth.

A NEW ELEMENT has been discovered in nickel ore from Norway. It is malleable, of white color, with a tinge of brown, presenting, when pure, a metallic luster, but oxidizing when exposed to the air. It is as hard as copper.

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Passing Events.

There has been no lack of exciting topics of discussion during the past week, the anti-Chinese outbreak at Seattle, W. T., and the riots in Loudon forming the principal ones. The trouble in the coke regions of Pennsylvania is not over, and the Chinese agitation on this coast seems to be spreading in all directions. The nation is called upon to mourn the loss of another of the great generals of the war of the rebellion, Major-General W. S. Hancock having died suddenly on Monday last.

Considerable attention is just now being turned to Northern California, which is found to be adapted to the cultivation of citrus fruits, and doubtless it will be more in favor for settlers hereafter. This will benefit the mining industry as well as the agricultural in that region, and those who visit the northern counties will find much that is attractive in the mineral fields.

After a long reign of assessments the Comstock comes to the front once more with a mining dividend. The Consolidated California and Virginia has declared one. It may be, with the more economical methods in vogue, some of the large mines there will yet pay handsomely. The miners are digging away in hopes of discovering a bonanza, which any day they may meet, for the possibilities of the lode at great depths are now being tested.

A BILL has passed the Senate appropriating \$350,000 to purchase a site for a post-office in this city.

Mine Signals.

The census officials made an inquiry into the modes of signaling in mines on this coast, and it was found that only 72 of the important ones use vocal signals alone, but in a large number of workings signals by voice are generally the only means of communication. The telephone or the telegraph would seem to be the most desirable means of signaling in large mines were it practicable to preserve the insulation of the wires. In most cases where it has been tried, however, difficulties have been experienced from imperfection of insulation. The wires must pass down the shaft and are subject to mechanical abrasion. Most shafts, too, are wet, and the water contains more or less acid. The batteries also introduce a complication which is undesirable. Experiments are being made, however, on telegraphic methods, which, when in good order, permit signals to be sent to the surface from the cage, even when it is moving at a maximum velocity.

The commonest mode of signaling in mines of considerable size is by means of the bell rope, and the method has the advantage of extreme simplicity. In deep shafts, however, it requires much force to ring the bell, and when the cage is in rapid motion it is extremely difficult to communicate with the surface. A very large proportion of accidents are induced or aggravated by the difficulties of signaling, and the imperfection of signaling apparatus. Many mines using gong or bell as a principal means or signaling have also other means. Among them are the telephone, telegraph, speaking-tube, Cornish clappers, triangle, shaking rope, rapping on bucket, etc.

COMBINATION MINE AND RANCH.—Work has been suspended upon the Caribou mine, at Fleming, New Mexico. With the exception of a few pockets of ore, nothing of consequence was struck, while the constant and excessive inflow of water greatly retarded operations and proportionately increased the cost of operating. The Silver City Enterprise says that the owners of the property have concluded to utilize the large volume of water their mine is capable of producing and for that purpose have resolved themselves into a cattle company. There being no other water of consequence for miles around they will produce an artificial stream in the gulch below the mine by pumping the water into it. As there is a large scope of excellent grazing country that can be made useful for cattle raising the project seems a very feasible and good one. The cattle ranch is now worth more to them than the original and subsequent cost of purchase and development of the Caribou mine. It isn't every country where people can prospect for a mine and strike a cattle ranch.

THE COMSTOCK.—The consolidated Virginia and California shipped \$64,136 in bullion last week. During the week 591 tons of ore were shipped to the Morgan mill, and 1,653 tons to the Eureka mill. The average value of this ore per battery sample assays was: Morgan mill \$15.22 per ton; Eureka mill, \$13.01 per ton. A dividend has been declared. Not a bad showing for what has been called a "played out" mine. The Best and Belcher had \$3,068 on hand on the first of the month, Crown Point \$26,497, Gould and Curry \$20,615, Hale and Norcross \$20,123, and Chollar \$7,974. In any other camp but the Comstock this would be considered a good showing. The letter of one correspondent in this number of the PRESS gives some interesting facts concerning deep mining on the lode.

THE Virginia Chronicle says the pay-rolls of the mines and mills engaged in crushing Comstock ore, and outside mines in Storey county will swell the total amount disbursed to employees for the month of January, 1886, to \$180,000, a falling off of \$10,000 from the sum disbursed in December. This is due to the shutting down of the mines and mills during the late storm. The pay-rolls for February will exceed \$200,000.

At the regular semi monthly meeting of the mine engineers, a resolution was unanimously adopted, indorsing the application made to the Board of Supervisors by the stationary engineers for the appointment of an official boiler inspector.

Practical Treatise on Hydraulic Mining.*

"A Practical Treatise on Hydraulic Mining in California," with descriptions of the use and construction of ditches, flumes, wrought iron pipes and dams, flow of water on heavy grades and its applicability, under pipe-pressure, to mining, has been written by Aug. J. Bowie, Jr., the well known mining and consulting engineer of this city, and published by Van Nostrand. The work is really a text-book, and probably the best one contributed to the literature of mining for some years. Mr. Bowie has had large experience in the subjects of which he treats, and has had access to sources of information which have not been open to other engineers; and he has, moreover, carried on, at his own expense, extensive surveys during a number of years for the purpose of obtaining exact information. He has made a special study of ditches, dams, etc., and his descriptions, tables, and conclusions will save a great deal of money and time in the future to any one engaged in this class of work.

The book is handsomely illustrated. A large map accompanies it, this being a map of the lower portions of the Sacramento and San Joaquin rivers, showing the principal auriferous deposits in California, and the tributary streams draining the mining districts. It is on a scale of 18 miles to the inch, and is handeomely and accurately made.

The preliminary chapter is devoted to the records of gold-washing all over the world, and is replete with most interesting information. The second chapter is on the history and development of placer mining from its incipency in California. The third is on the general topography and geology of California. These subjects are treated in concise style, and the general features of the geology and geography of the country are sketched, so as to enable the reader to picture to himself the regions which are described in other chapters, and to thoroughly understand the working of the hydraulic mines. There is also a chapter on the distribution of gold in deposits, and the value of different strata, and on the amount of workable gravel remaining on the western flank of the Sierras. Mr. Bowie then describes the different methods of mining gold placers, both surface and deep. The chapter on reservoirs and dams is a specially useful one, describing their construction, and the principal ones in the State. His remarks on the measurement of flowing water are excellent and of great value.

As a matter of fact this is the first time that it has been practically demonstrated what the coefficients of discharge are for water flowing in ditches on heavy grades. The text books heretofore have never treated this subject, and the engineer has been left to grope in the dark and apply the old formulas, which has caused endless loss, and in some cases entailed financial disaster. The deductions given in this chapter are drawn from the facts as therein shown, viz: The area of the ditches is stated, the grade or slope given, the quantity of water turned in at the head of the ditch is accurately measured and stated, and the amount discharged at its outlet at varying distances given. The results are then formulated. It is a noteworthy fact that all experiments for the determination of coefficients for the flow of water in ditches and canals, have been made on short lines and on light grades, and even Higham, in his work on hydraulics, gives 10½ feet per mile as the heaviest grade on which water would probably be made to run in ditches or canals. The instances cited by Mr. Bowie show grades from 12 to 25 and 30 feet per mile, and the distances over which the water is run and delivered are 40 and 50 miles and over.

The chapter on ditches and flumes gives the location and construction principles, examples of ditches, flume construction, dimensions, cost, etc. In the treatment of this subject drawings are given which show in detail the construction of the various forms in use and which have been proven by long experience to be the best. The cost per foot or per box is given in every instance, and the rate of labor and material is stated, so that any person is enabled to make estimates by substituting other rates, as the case may require. In the chapter on pipes and nozzles is a very useful table giving the amount of iron, weight, etc., in differ-

ent sized pipes, with varying thickness of gauge used in their construction. This is accompanied by a table of rivets. In the chapter on blasting, details are given which have never before been published. Descriptions of notably large blasts are given, with systems adopted, cost, etc. This chapter is a very useful one, as the methods are carefully described, with diagrams, etc. That on the distribution of gold in sluices is an interesting one, giving tables which show proportion of gold caught at certain distances in the sluices, under currents, etc.

Mr. Bowie's remarks on the "Duty of the Miners' Inch" are practical and to the point. This subject has been usually handled in general terms. Absolute data are here given, and the facts from which they were deduced are stated. This is specially useful as showing what has been done with water on different properties, serving as a guide to those who wish to know what can be done with various quantities of water under the conditions stated.

The other chapters are on "mechanical appliances," "blasting gravel banks," "tunnels and sluices," "tailings and dump," "washing or hydraulicking," "loss of gold and quicksilver," and "statistics of the working and the yield of gravel." There are 72 engravings in the work, and a number of useful tables for reference derived from the experience of our largest companies.

It will be seen from this brief summary of the contents of the book, that it is not only to hydraulic miners that it is useful, but to placer, drift, river, beach, and other surface miners. The data concerning ditches, flumes, reservoirs, dams, etc., will be found of service even to those engaged in irrigating work or other users of water. Mr. Bowie has brought to his task experience and ability, and has produced a book of value not only to the profession of mining engineering, but to miners as well. He has confined himself to the technical discussion of his subject, without going into the vexed "debris question" at all. He gives his authority when quotation is made, and chance statements are entirely avoided. The work will be found useful to all miners, and will serve as a *valde mecum* for engineers in the branch of which it treats. All the subjects in the book are treated from a practical standpoint, and the results of actual experience are given: it is not a question of what may be done, but a question of what has and what is being done.

THE Kuebig Brothers of Calico, San Bernardino county, have failed in their mining and milling enterprise. Their liabilities are about \$6,500 including about \$2,000 in attachments on the mill and other property and about \$1,000 mechanics' and laborers' liens on the same, by local creditors. Their failure is due partly to extravagance and useless expenditure, and partly on account of trying to mill from 8 to 12-ounce ore, and employing 40 to 50 men, three-fourths of whom were doing "dead work." The Calico Mining and Reduction Company and the Kuebig Bros. have spent \$45,000 in cash besides the bullion returns, amounting to about \$75,000, since they started the mill last Fourth of July. The Calico Print says that this is the only failure of any consequence that has occurred in the district.

THE Pacific Bridge Company will soon commence the erection of an iron bridge, consisting of three 100-foot spans, across the Los Angeles river, at Aliso street. The bridge is to be built for the Central Railroad Company, the street-car line.

IT is stated that the English purchasers of the Cottonwood Canyon nickel mines, Nev., intend to work the mines extensively and reduce the ore on the ground, as nut pine wood for fuel is abundant in the vicinity of the mines.

A COMPANY of capitalists have bought 320 acres of land, rich in iron ore, at Tintic, U. T., on the shore of Utah lake, and will erect smelting furnaces and go into the business of producing pig iron.

TAYLOR, Nevada, though much talked of outside, is said to be very dull at present. The White Pine News advises men not to come there in search of work.

J. B. RUPLEY, a miner well known through the southern mining country, died last week at Calico.

*—This book may be obtained at publishers' rates (\$5 post paid) from Dewey & Co., publishers MINING AND SCIENTIFIC PRESS, 252 Market street, San Francisco.

Virginia City, Nevada.—No. 2.

Deep Mining.—Is There Money In It?—Some Novel Theories.

[By our Special Correspondent.]

At present there appears to be a vigorous sentiment on the subject of deep mining in this camp. Whilst during the past few years no great bonanza ores, like those mentioned in our last article, have been struck, still the unflagging energies and the unswerving faith of those who have continued to operate these vast and expensive works, have always argued the utmost confidence in the ultimate discovery of such. If no paying ores are likely to be found in such deep and expensive mining, it would certainly display the height of prodigality, as well as sheer waste of time, to operators and stockholders alike, to continue in so fruitless a project. One theory, recently offered to the public, if conclusive, should certainly end all controversy as well as all further efforts in the department of deep mining. This theory is doubtless well worth our consideration, inasmuch as it emanates from such a source as a writer in a Government report. For instance, Mr. O. J. Hollister, in the report of the director of the U. S. mint for 1882 says, on page 262, in regard to the famous Emma mine, Utah: "It seems that in all these mines for a thousand feet down, on the dip of the formation are carried the ore chimneys, chutes, and channels, and below that they give out or cease to pay, thus giving color to the theory, that the presence of the precious metals is due to surface agencies."

"The same thing is observable at Leadville, in Colorado, and elsewhere. The Iron Silver, at Leadville, pitches into the hill at an angle of 20 degrees below the horizon, and the hill rises at considerably steeper angle. They claim 300 feet on the dip, and beyond that distance, on the top of the hill, are sinking for the same vein. It is doubtful whether the ore will continue that far, or indeed so far as 2000 feet. The overlying country rock is so deep as to have prevented the operation of surface agencies." "The Emma, Flagstaff and all the mines in the Little Cottonwood belt go down more or less like wells, the same as the channels in the Iron Silver, Silver Chord, and mines on Carbonate and Fryar hills, at Leadville, and in both places everything seems to indicate that the ore is lost for all practical purposes at a greater or less distance from the surface, governed largely by the thickness of the hanging country rock, and seldom exceeding 1500 or 2000 feet." Thus we have presented, by the writer referred to in this governmental report, a theory which, if acted upon, would effectually close and debar all further mining operations below the 2000-foot level. It assumes to state that all

Deposits of the Precious Metals

Are derivable from surface agencies (whether atmospheric, aqueous, chemical or electrical, we are not informed), and inasmuch as it is impossible for these agencies to operate below the 1500 or 2000 foot level, there can, therefore, be no deposits of gold or silver below these levels in sufficient quantities for any practical purposes.

The same Report, in setting forth the mineral interests of Nevada, follows out the above theory in regard to deep mining on the Comstock lode, and after recounting the bonanza outputs of the Ophir, Gould & Curry, Savage, Hale & Norcross, Imperial, Yellow Jacket, Kentucky, Crown Point and Belcher, and finally the Con. Virginia and California, says:

Stimulated by the unprecedented amount of ore found along the line of the lode, the various companies have prosecuted their work in sinking deeper shafts and driving drifts and crosscuts into unknown ground, at an expense totally disproportionate to the results attained.

So far as exploration has developed, no ore bodies of importance have been found to exist below the 2000-foot level, and it would seem as though this point was the deepest boundary to the zone of ore bodies, and yet the explorations have continued to a depth of, in some instances, 3100 feet.

It is a serious question whether it is advisable to continue operations in these mines. The ledge matter at this depth is of great width, but it contains only small seams and stringers of ore, in most cases of very low grade. Whether by following these they may lead to important ore bodies is of course unknown, but the search will doubtless be continued so long as the stockholders will furnish means to prolong the work.

By the foregoing statement and conclusion, the nature and importance of this question looms up most conspicuously into view. It is very plain indeed that the various companies on this Comstock lode are seriously bent upon the project of going down still farther into these mines until the small seams and stringers of ore develop into something more tangible and profitable. The machinery heretofore in full working order upon these various mines

is still upon the ground here, in a good state of preservation, although not all in full and profitable employment.

In Surveying These Various Plants,

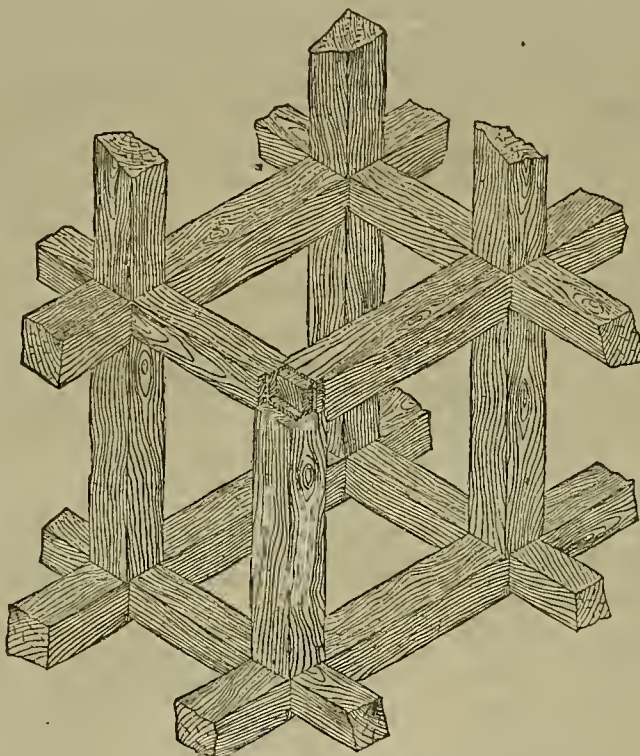
Few would put the cost of this enormous and splendid array of works at less than \$30,000,000, and this whole mechanical plant is but the smallest portion of the value of the work that has been laid out beneath the surface on these mines to open up and extract the ore, as well as to prospect the surrounding districts adjacent. Admitting, as we reasonably can, that the entire property upon the ground, and the vast work performed beneath it, would scarcely fall short, but rather exceed one hundred millions of dollars, what must be thought of the wisdom of any one who would seriously question the advisableness of continuing operations in these mines, especially when we reflect that from the lowest estimates not less than four hundred millions have been taken from them as the result of previous efforts. Verily the theory that only began with a color in regard to depositing the precious metals through surface agencies has here put forth a wonderful and startling outcome, when the formulator of it would seriously question whether it is advisable to continue operation in these mines, since no ore bodies of importance have been found to exist below the 2000 foot level, and it would seem as though this point (2000 feet) was the deepest boundary to the zone of ore bodies; but still remarking that in violation of this principle,

Explorations Had Been Continued

In some instances to a depth of 3100 feet, and would doubtless be continued, so long as the

no means a novelty. Silver mining in Germany, at Freiberg, of a very deep order, has been successfully and profitably carried on since the 10th century. It is stated that a silver mine, over 6000 feet in depth, is now being worked in Silesia. Pliny and Vitruvius bear testimony to silver mining in their times, that went down over a mile and a half in depth, showing a skill in ancient engineering in the mining department equal to that which constructed the pyramids. If the ancients in the old world could sound the earth to a depth of nearly 8000 feet and make silver mining profitable, we should certainly conclude that no insurmountable obstacle should present itself to defeat the Comstockers from going down at least 4000 feet, as a fair test of their energy, skill and faith. Certainly the mineral interests of this camp at present and heretofore would seem to warrant an outlay of effort and expenditure, in its prospecting and development, of which the present would appear only infantile in comparison before any serious notion should be entertained as to the advisability of prosecuting the work or of turning over all these magnificent accumulations of property to the moles and to the hats. In the census report on the statistics and technology of the precious metals, S. F. Emmons in the chapter on lead smelting at Leadville, Colorado, makes use of this language concerning the Leadville systems: "In conclusion it may be said the lead smelting as carried on in this region, while not entirely beyond criticism, has been brought to a high degree of perfection, and is extremely creditable to American metallurgists."

When the writer of this (in 1880) was engaged in reviewing, with the superintendent, the extensive smelting works at Pueblo, Col.,



SET OF MINE TIMBERS.

stockholders would furnish means to prolong the work.

The conclusion drawn from such statement would be that it was but a waste of time, money and labor to prosecute an enterprise of so unpromising a nature. Inserted in a common newspaper, such declarations would hardly claim momentary recognition; but being published in the report of a Government official, and scattered throughout every gold and silver camp in the States, we believe such statements should be met with the closest scrutiny, and allowed such a place only as their proper merits justly entitle them. All mining interests of this character have long since been ranked among the systematic and ordinary industries of the country, and held subject to the same fluctuations as other pursuits: have their periodic seasons in the sinking fund, as well as their more acceptable and gratifying records in the dividend. The minimum rate of interest on the lowest estimate of coin already taken from these mines, would be amply sufficient to operate the whole of them, *in perpetuo*, and after a manner to correspond with the magnitude of the claim, which they hold upon a vast multitude, who have been so greatly enriched by them. Whilst

These Shafts on the Comstock

Are confessedly deeper, and the prospectings more extensive than any to be found on this continent, still, they by no means, as yet, come up to a standard corresponding with "the unprecedented amount of ore found along the line of the lode." Such being the case, we are naturally led to inquire, if the structural character of North America, in its mineralogical order, is so different from that of Europe as to admit of no terms of comparison. Deep mining in the old world, in quest of the precious metals, is by

put up mainly in the interest of Leadville ores, he felt irresistibly drawn to the same conclusion. If such an opinion could be cherished in regard to the Leadville works, equally as strong a one might be entertained in viewing the plant now operated in behalf of the Hale & Norcross, Chollar and Potosi and Savage mines. These mammoth pieces of machinery, employed on the surface as well as below ground on these mines are certainly the most marvelous of their kind that can be found in any part of the earth. Their manufacture and successful operation here may also be considered extremely flattering and creditable to American machinists and engineers.

J. B. P.

THERE are very few people at Quijotoa, Arizona. The well is closed. It is now said that the mines never belonged to the bonanza firms—they merely advanced money to work them on security on the stock.

THE supply of water in Six-Mile canyon creek is more than ample to keep the quartz mills running to their full capacity, and averages 90 tons every 24 hours.

PERSONAL inquiry in the districts lying at the east end of London shows that an average of 40 per cent of the highly skilled workmen are unemployed.

MONTANA'S copper output last year was 59,500,000 pounds, an increase of 18,887,217 over the figures for the previous year—about 25 per cent.

Mine Timbering.

The methods employed in timbering shafts and drifts are very much alike all over this coast. The system adopted for preventing the caving of excavated ore bodies originated on the Comstock, and was described by Hague in the volume on "Mining Industry" of King's Geological Exploration of the Fortieth Parallel. We have heretofore given engravings of this system. The framing of the timbers at Eureka, Nev., however, presents some peculiarities to which Mr. Curtis, in his monograph on the Silver Lead Deposits of Eureka, calls attention.

As a rule, the limestone comprising the ore-bearing zone requires but little timbering where it is penetrated by drifts and winzes, and it is only when it has been crushed to a powder that workings of this character need to be kept open by timbers. Where drifts have been run along the line of the quartzite and limestone contact, timbering is always necessary, as the quartzite and accompanying clay scale off and in course of time fill up the drift. Drifts in the quartzite itself stand better, but, nevertheless, often require timbers, especially where there is much water. There are but few workings in shale, but if there were, much timbering would no doubt be required to keep the ground open for any considerable length of time. Shafts and winzes in the limestone of course require some timbers, but usually no more than are necessary for the support of ladder-ways. Below the water level the limestone stands very well, owing partly to its nature and partly to the compact nature of the rock as depth is attained.

The engraving on this page represents a complete set of rectangular timbers, as they are used in carrying up a stope in an ore body. These timbers are similar in their general features to those in use on the Comstock. It is only as regards the manner in which they are framed that they differ, and even in this respect the differences are slight, though worthy of attention. We shall give in next week's PRESS engravings of the ties, caps and posts, with accurate dimensions, etc., showing exactly how the framing is done.

THE CHASE HEIRS INTEREST.—The Department of State has been hesitated with numerous questions regarding the \$800,000,000 supposed to be in the Bank of England, awaiting distribution among the Chase-Towneley-Lawrence heirs, and Secretary Ayard has issued in reply a long circular letter, based on information from our minister in London, in which he strongly advises the inquiring parties to "pay no attention to any reports or statements of associations in reference to claims on the above-named estate," and not to "pay any money to agents for prosecuting the same." Moreover, private advices from a reliable law firm at the East, convince us that the whole business, on this side of the water, was set on foot by designing swindlers in hopes to entrap and fleece the credulous and unwary.

ACCORDING to the Colton *Semi-Tropic*, surveyors are already in the field looking for the most practicable route for the cut-off between Mojave or Lancaster and the Cajon Pass, by which a saving of 75 miles haul of freight and passenger trains between San Francisco and Colton can be saved.

THE Yreka *Journal* says: It is now stated that the railroad company is hiring white men principally to work on the railroad above Delta, and possibly the road through this county will be built by white labor, which will make lively times in Siskiyou while work is in progress.

EXPERIMENTS on the Staten Island railroad have proven that it is possible to send telegraphic messages to and from railroad trains which are running at a rate of 30 miles per hour.

AURORA, Esmeralda county, is beginning to attract considerable attention and threatens to come once more to the front as a hulsion producer.

THE Moote Cristo mine in Seven-Mile canyon has started up and is producing 60 tons of ore per week. The Cosmopolitan has shut down.

THE President has ordered out the United States troops to quell the disturbances at Seattle and other places in Washington Territory.

PRACTICAL HYDRAULICS.*

NUMBER 17. COPYRIGHTED.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

EQUATIONS AND RULES FOR VELOCITY HEAD, LENGTH, DIAMETER, AND VOLUME OF FLOW FOR CLEAN PIPES.

The general equation for the volume of flow is:

$$q = a v. \quad (149)$$

Substituting in (149), the value of $a = \frac{\pi d^2}{4}$ (area of cross section of pipe), and the value of v of (129), noting that $r = \frac{d}{4}$,

$$q = \frac{1}{2} \times \frac{\pi}{4} \left(\frac{2g}{c_f} \right)^{\frac{1}{2}} \left(\frac{h_f d^5}{l} \right)^{\frac{1}{2}} \quad (150)$$

For convenience of notation put,

$$c_r = \frac{1}{2} \times \frac{\pi}{4} \left(\frac{2g}{c_f} \right)^{\frac{1}{2}} = 3.1514 \left(\frac{1}{c_f} \right)^{\frac{1}{2}} \quad (151)$$

$$\text{Then } q = c_r \left(\frac{h_f d^5}{l} \right)^{\frac{1}{2}} \quad (152)$$

Transposing (152) successively with respect to h_f , d , l , and reducing,

$$h_f = \left\{ \frac{l q^2}{c_r^2 d^5} \right\} \quad (153)$$

$$l = \left\{ \frac{c_r^2 h_f d^5}{q^2} \right\} \quad (154)$$

$$d = \left\{ \frac{l q^2}{c_r^2 h_f} \right\}^{\frac{1}{5}} \quad (155)$$

Substituting in Eq. (151), the values of $\pi = 3.1416$, $2g = 64.4$, and of $c_f = .00644$, as a mean coefficient of resistance within the pipe:

$$c_r = 39.27. \quad (156)$$

By reference to Table 16, the coefficient of resistance .00644, employed in finding the value of c_r of Eq. (151), is due a velocity of 2.25 feet per second in a 6-inch pipe, 5 feet velocity in a 3-inch pipe, and 7 feet velocity in a 12-inch pipe. Its range thus appears too limited for general application.

Substituting the value of c_r of (156) in Eqs. (152), (153), (154) and (155), there results:

$$q = 39.27 \left\{ \frac{h_f d^5}{l} \right\}^{\frac{1}{2}} \quad (157)$$

$$h_f = .000648 \left\{ \frac{l q^2}{d^5} \right\} \quad (158)$$

$$l = 1542.13 \left\{ \frac{h_f d^5}{q^2} \right\} \quad (159)$$

$$d = .23034 \left\{ \frac{l q^2}{h_f} \right\}^{\frac{1}{5}} \quad (160)$$

Equations (157), (158), (159) and (160), expressed as written rules are as follows:

Rule 35.—The quantity of flow in cubic feet per second, in a clean pipe, is equal to 39.27 times the square root of the quotient arising from dividing the product of the head, and the 5th power of the diameter, both in feet measure, by the length of the pipe in feet.

Rule 35 corresponds to Eq. (157).

Rule 36.—The head is equal to .000648 times the quotient arising from dividing the product of the length of pipe in feet, and the square of the discharge in cubic feet per second, by the 5th power of the diameter of the pipe.

Rule 36 corresponds to Eq. (158).

Rule 37.—The length of a pipe is equal 1542.13 times the quotient arising from dividing the product of the head and the 5th power of the diameter by the square of the discharge in cubic feet per second.

Rule 37 corresponds to Eq. (159).

Rule 38.—The diameter is equal to .23034 times the 5th root of the quotient arising from dividing the product of the length of the pipe in feet, and the square of the discharge in cubic feet by the head in feet.

Rule 38 corresponds to Eq. (160).

Rule 39.—The values of quantity of flow, the head, length of pipe, and diameter of pipe are found by Table 17.

Case 1st.—Quantity of flow being required, divide the given head by the given length, both in feet. Find in "sine of slope" column, the sine equal to this quotient, opposite which, in discharge column for the given diameter, will be found the quantity of flow sought.

Case 2d.—The head being sought, find the given

discharge, or nearest approximate thereto, in the discharge column for the given diameter, opposite which, in "sine of slope" column, will be found the proper sine, which, multiply by the given length of pipe. The product will be the head sought.

Case 3d.—The length of pipe being required, find in the discharge column for the given diameter, the given quantity of flow, opposite which, in "sine of slope" column, will be found the proper sine. Divide the given head by this sine, the quotient will be the length of pipe required.

Case 4th.—The diameter being required, divide the given head by the given length of pipe. Find in "sine of slope" column the sine equal to this quotient, opposite which, in discharge column, find the given quantity of flow, or nearest approximate thereto. The diameter for this discharge will be the diameter sought.

Ex. 78.—The head being 40 feet, the pipe 6 inches diameter, 10,000 feet long, what is the discharge in cubic feet per second?

Cal. 1st.—Substituting the given values $d = 6" = .5$ feet, $h_f = 40$ feet, and $l = 10,000$ feet in Eq. (157).

$$\frac{h_f d^5}{l} = (.5)^5 \times 40 \div 10,000 = .000125;$$

$$39.27 \times (.000125)^{\frac{1}{2}} = .440 \text{ cubic feet.—Ans.}$$

Employ Rule 39, case 1st.

Cal. 2d.—Dividing the given head by the given length of pipe, $s = 40 \div 10,000 = .004$, sine of slope.

In Table 17, find the sine of slope, opposite which, in discharge column, for 6-inch pipe, is found the quantity sought—.444 cubic feet.—Ans.

Ex. 79.—A pipe 3 inches diameter, 10,000 feet long, discharges .247 cubic feet per second, what is the head?

Cal. 1st.—Substituting the given values, $d = 3$ inches, $l = 10,000$ feet, and $q = .247$ cubic feet in Eq. (158):

$$\frac{l q^2}{d^5} = (.247)^2 \times 10,000 \div (.25)^5 = 61.7;$$

$$.000648 \times 61.74 = 400.05 \text{ feet head.—Ans.}$$

Employ Rule 39, case 2.

Cal.—In Table 17, find in 3-inch discharge column, .2469 cubic feet, nearest approximate to the given quantity .247, opposite which, in sine of slope column, is found .04; then $h = l s$.

$$.04 \times 10,000 = 400 \text{ feet head.—Ans.}$$

Ex. 80.—If, under a head of 42 feet, a pipe 4 inches diameter discharges .3 of a cubic foot of water per second, what is the pipe's length?

Cal. 1st.—Substituting the given values of $d = 4" = \frac{1}{3}$ foot, $h = 42$, and $q = .3$ cubic feet in Eq. (159),

$$l = 1542.13 \times 42 \times \left(\frac{1}{3} \right)^5 \div (.3)^2 = 2961.6 \text{ feet.—Ans.}$$

Employ Rule 39, case 3.

Cal. 2d.—In Table 17, find in discharge column for 4-inch pipe, .3036 cubic feet nearest approximate to the given quantity .3 cubic feet, opposite which, in

sine of slope column, is found .014; then $l = \frac{h}{s}$; $l = \frac{42}{.014} = 3000$ feet.—Ans.

Ex. 81.—The head of water being 280 feet, required the diameter of a pipe 4000 feet long, that will discharge 80,000 gallons in 24 hours?

Cal. 1st.— $q = 80,000 \div (24 \times 60 \times 60 \times 7.5) = .124$ cubic feet, discharge per second.

Substituting the given values, $q = .124$ cubic feet; $h_f = 280$ feet, and $l = 4000$ feet in Eq. (160).

$$d = .23034 \left(4000 \times (.124)^2 \div 280 \right)^{\frac{1}{5}} = .17 \text{ feet} = 2.04 \text{ inches diameter.—Ans.}$$

Employ Rule 39, case 4.

$$\text{Cal. 2d.—} s = \frac{h}{l} = \frac{280}{4000} = .07, \text{ sine of slope.}$$

In Table 17, find sine of slope .07, opposite which, in discharge column, find .1286 cubic feet per second, nearest approximate to the given volume .124. This is found under heading "2 inches" diameter. The diameter required then is 2 inches.—Ans.

COEFFICIENT OF FLOW.

When the coefficient of flow in a long pipe is $c = 39.27$, the coefficient of velocity deduced from Eq. (130) or (129), is

$$c = \left(\frac{2g}{c_f} \right)^{\frac{1}{2}} = \frac{.644}{.00644} = 100. \quad (161)$$

In which case Eq. (130) becomes

$$v = 100 (r s)^{\frac{1}{2}}, \quad (162)$$

and Eq. (129), by observing that $r = \frac{d}{4}$,

$$\text{becomes } v = 50 \left(\frac{h_f d}{l} \right)^{\frac{1}{2}}. \quad (163)$$

Several standard authors on hydraulics find as follows:

$$\text{Chezy finds } c = 100. \quad (164)$$

$$\text{Eytelwine finds } c = 100. \quad (165)$$

$$\text{Leslie finds } c = 100. \quad (166)$$

$$\text{D'Aubuisson finds } c = 95.6. \quad (167)$$

$$\text{Blackwell finds } c = 95.83. \quad (168)$$

$$\text{Hawksley finds } c = 96.09. \quad (169)$$

$$\text{Bartlett finds } c = 95.88. \quad (170)$$

$$\text{Jackson finds (small pipes) } c = 100. \quad (171)$$

$$\text{Fanning finds (mean for small pipes), } c = 100. \quad (172)$$

$$\text{D'Arcy finds (for larger pipes) } c = 113.8. \quad (173)$$

Substituting the value of $c = 113.8$, as found by D'Arcy, the value of $\pi = 3.1416$, in Eq. (150), and reducing,

$$q = 44.69 \left\{ \frac{h_f d^5}{l} \right\}^{\frac{1}{2}} \quad (174)$$

COMPARISON OF RESULTS OBTAINED BY EQUATION (174) AND BY TABLE 17.

If the head of water be 100 feet, the pipe 1 foot diameter, and 10,000 feet long, the quantity of flow by Eq. (174), will be $q = 4.469$ cubic feet per second, and by Table 17, $q = 4.305$ cubic feet per second.

The head being 16 feet, the pipe 4 feet diameter, and 10,000 feet long, the quantity of flow by Eq. (174) will be $q = 57.20$ cubic feet per second, and by Table 17, $q = 68.50$ cubic feet per second.

When the head is 100 feet, the pipe 6 inches diameter, and 10,000 feet long, the discharge by Eq. (174) will be $q = .79$ cubic feet per second, and by Table 17 $q = .72$ cubic feet per second.

The head being 20 feet, the pipe 8 feet diameter, and 10,000 feet long, the quantity of flow by Eq. (174) will be, $q = 361.8$ cubic feet per second, and by Table 17, $q = 496.4$ cubic feet per second.

These comparisons show that the coefficient, 113.8, proposed as a mean, is too large for small pipes and too small for large pipes; that it is adapted to a pipe 1 foot diameter, with a limited range for either smaller or larger diameters.

They illustrate, also, that the engineer, in the practice of his profession, cannot safely venture far from an established fact in hydraulics, without experiment as a guide.

BENT PIPES.

Bends occurring in pipes resist the flow of water through them.

To determine the additional head requisite to overcome this resistance, Weisbach (partly on the experiments of Du Buat, but chiefly on his own experiments), gives substantially the following formulas and tables compiled from them:

ANGULAR BENDS.

Let h_a = the additional head required to overcome one angular bend.

m = one-half the angle of deflection of the bend.

z = the coefficient of bend or knee resistance.

v = velocity of flow.

$$\text{Then } h_a = z \left\{ \frac{v^2}{2g} \right\} \quad (175)$$

$$z = 0.9457 \sin^2 m + 2.047 \sin^4 m. \quad (176)$$

Table 19 is calculated from Eq. (176).

TABLE 19.

Coefficients for Bend Resistances in Pipe.

m°	10°	20°	30°	40°	45°	50°	55°	60°	65°	70°
z	.046	.139	.364	.740	.984	1.260	1.556	1.861	2.158	2.431

Rule 40.—The additional head required to overcome one angular bend is, in case the head generating the velocity be given, equal to the product of the given head, and the coefficient of bend or knee resistance, due the given angle of deflection found in Table 19; and is, in case the velocity be given, equal to the product of said coefficient and the square of the given velocity, divided by 64.4.

Ex. 82.—The velocity of water in a pipe, in which occurs one rectangular bend, is 10 feet per second, what additional head will be requisite to overcome the resistance of the head?

Cal.—By Rule 40, square of velocity, divided by 64.4 = $10 \times 10 \div 64.4 = 1.553$ feet; $m = \frac{90^\circ}{2} = 45^\circ$, one-half the angle of deflection.

By Table 19, the value of z , corresponding to 45° , is .984; then $1.553 \times .984 = 1.528$ feet, additional head.—Ans.

ENGINEERING NOTES.

Railway Construction in 1885.

The amount of new railway construction completed in 1885 is estimated at a little more than 3000 miles. Although this aggregate rather exceeds than falls below expectation, it represents a smaller addition to the mileage of the country than that of any previous year since 1878. The unfortunate position of railway interests, the unsatisfactory returns of many companies, the widening of the circle of railway bankruptcy, and other influences helped to strengthen the wholesome conviction that too many competitive and premature lines had already been built, and to generate in financial circles a much stronger disposition to repress than to encourage new schemes.

The fact that construction was continued to the extent reported, under the adverse conditions existing, affords another evidence of the force of the extinguishable desire to float new enterprises of varying degrees of merit. In peculiarly auspicious periods it finds expression in annual additions of 10,000 miles or more to the length of pre-existing lines, and even in the face of extraordinary difficulties the additions only dwindle down to about or a little less than 3000 miles.

Nearly all the new construction of 1885 occurred in comparatively new or sparsely-populated Southern or Western States. Operations in Pennsylvania constituted the most notable exception to this remark. A number of short new roads or extensions were completed in this commonwealth.

In the Southern States the additions to new mileage were exceptionally large in Florida, chiefly on account of the influx of northern immigrants and winter residents. In Georgia and North Carolina lines of considerable length were also constructed, mainly for the purpose of furnishing important links in comprehensive rival systems.

More new mileage was completed in Missouri than in any other single State, and Kansas probably stands second on the list. Western extensions of the Missouri Pacific system of considerable significance are now also proposed. The new developments of last year, which foreshadow important labors during 1886, embrace extensions of various northwestern and Pacific lines. The process of pushing new construction into regions in which settlements are expected to follow the railway track has by no means been completed, and many ambitious and strong systems have been formed in the west and northwest, which are eager to keep pace with their rivals in developing new territory. Nebraska, portions of Dakota, Missouri, Minnesota, California and Washington territory were the theatre of considerable amounts of new construction in 1885, and they will probably furnish routes for large additions to mileage during the present and future years.

A NEW METHOD OF PROPULSION OF VESSELS.—At a ship yard in New York there is a vessel under construction and nearly finished, which is very attractive to the curious. It is intended to illustrate a partial solution of the great problem which mechanical sciences has before it, viz., how to avoid the enormous waste of energy that accompanies work. The elemental forces are all in harness, steam having superseded wind and water in the driving of machinery, and electricity already crowding into the place of steam; but, in every case, the result is obtained at a cost which at last has come to be regarded as extravagant. Of the energy developed by the combustion of coal under the boilers of an engine, only a very small percentage is available for driving the wheels of the machine. All the rest is dissipated before it reaches the point where it can be made available. The constructors of this vessel propose to avoid this waste by making the combustion itself the propelling force and driving the boat through the water as a rocket is shot through the air, without the use of machinery and the accompanying loss of energy. This will be done by firing blank cartridges from the stern ports; charges from the forward ports will back her, and charges fired at one side change the direction. The inventors make enthusiastic claims over the expected speed and low cost. The cost of fuel (gunpowder) is stated to be trivial, the claim being made that they will be able to navigate some 180 miles at a cost of 80 cents for gunpowder. As a contemporary says, the vessel may go but its occupants cannot sleep.

A CABLE ROAD WITHOUT GRIPS.—A new system of cable railway is being tried at Binghamton, New York, which is of especial interest, because it dispenses altogether with the grip. Two cables are used, one driven in the ordinary manner by a stationary engine, the second, and smaller, cable taking motion from the first. This second cable is led continuously over a loose drum or pulley fixed under the car. While the drum is free to revolve, the cable simply imparts motion to it and the car does not move, but by the application of a brake stopping the motion of the drum, the car is carried forward with the cable.

The Philadelphia Board of Education will, on February 13th, inaugurate a class for the instruction of teachers in designing and modeling. The experiment if successful, will be of the highest importance to the public schools.

USEFUL INFORMATION.

TO REMOVE GLASS STOPPERS.—After wiping the neck of the bottle quite dry, bring this part over a gas flame, and gradually bring it nearer to the flame, until it has become quite warm. In doing this, be careful not to heat it too quickly (as this would be likely to cause it to crack), and keep turning the bottle around constantly, so that the neck shall be heated uniformly all around. The object of this manipulation is to heat the neck of this bottle only, and by its expansion to loosen its hold on the stopper. To succeed, therefore, the operator must carefully avoid letting the heat strike the stopper, for if this is done it will also expand, and remain as tight as ever. By skillfully turning the neck of the bottle for a few seconds in proximity to a gas flame, a steady pull and twist on the stopper will almost certainly release it. If it should still prove obstinate, a smart tap with a block of wood will generally start it. This simple plan is commonly resorted to in the laboratory, and we have rarely known it to fail. Some prefer to wrap the neck of the bottle with a few turns of a cloth or rag and pour hot water over this, but this will not always succeed, as it is troublesome to confine the hot water just where it is wanted.

SINGULAR ACTION OF GUN COTTON ON BRICKWORK.—Three tall chimneys belonging to Kunheim & Co., of Berlin, Germany, were lately destroyed by means of gun-cotton. The largest was about 147 feet high, and 10 feet diameter at the base. In order that it should fall outward from the city, the charge of gun-cotton (about 57 pounds) was attached in portions to the side next the city, and to the adjacent sides. All three were exploded simultaneously with a magneto-electric apparatus. The chimney, instead of falling obliquely, collapsed vertically, and on inspection the four walls of the pedestal were found to have been driven outward. The bricks were all detached from each other, and nearly all entire. The debris was thrown a very little distance. The two other chimneys, treated similarly, fell as was expected—i. e. obliquely away from the city. One of them, in falling, broke in two about the middle.

JAPANESE CASTINGS.—The Japanese are known to be skilled casters of metals. In the Vienna exhibition there was a casting representing a peacock with drooping and unsprung tail, many of the feathers and their bars representing the appearance of reality, so delicately were they produced. The Japanese employ more time and labor in perfecting metal work than the workmen in any other country. They appear to understand the art of blending colors in metal work. While giving to metal work the most artistic finish, they carefully avoid anything approaching glitter, considering that as beautiful effects can be worked out upon common metals as upon gold and silver. Two of the largest castings in the world are to be seen at Nara and Kamakura, Japan; the one 47 feet high and the other 53½ feet.

The relative value of running leather belts with the grain side to the pulley as compared with flesh side contact has been determined by experiment with substantial accuracy. It is a fraction more than one-third greater with the former than with the latter application. The main reason ordinarily assigned is the advantage derived from the smoother surface, closer contact and better adhesion, but another reason is that it is better to crimp the grain side than to stretch it, as is the case when it is used outside. If a pulley is covered with leather, grain side out, so that two leather surfaces come in contact, grain against grain, there will be more adhesion, which will be increased by using castor oil as a dressing.—*Industrial Review.*

CLEANING MIXTURES.—A good cleaning mixture can be made with two ounces of liquid ammonia, two ounces of soap finely shaved, two teaspoonfuls of powdered saltpetre. Put these in a large, open-mouthed bottle, and add one and one-half pints of warm water. Shake well occasionally. It will be ready for use in two or three days. It is just the thing to use in washing delicate colored articles; also to add to the water for shampooing the head, and a little added to water and sprayed upon plants kills any insects which may infest them, while at the same time it is fertilizing.

BONES IN IMITATION OF IVORY.—A simple and effective method of bleaching bones, to give them the appearance of ivory, has been discovered. After digesting the bones with ether or benzine to recover the fat, they are thoroughly dried and immersed in a solution of phosphoric acid in water, containing one per cent of phosphoric anhydride. In a few hours they are removed from the solution, washed in water and dried.

MEXICAN FEATHER WORKS.—Slow, patient toil is the secret of the marvelous perfection of this beautiful work. A traveler writes: "I tried hard to find out how they made the lovely birds on cards which they offered for sale on the streets. A friend took me to the house of one of these artists. It was a little hovel, where he sat on the mud floor and toiled. But when he heard us coming he put away all his

work and would not let us see it. He was an Indian, with brown skin, and black, straight hair. He wore ragged clothes and had an old blanket to keep him warm at night. Poor as he was, no money would tempt him to show us the secret process he had learned from his father, which had been kept in the family for hundreds of years. Great skill is required to produce a perfect picture. First the Indian traces on the card the outlines of the body of the bird in wax, just enough for the feathers to stick to. Then he begins at the lower part and places them on, one at a time, one row lapping over the other as a slater lays slates. He works slowly and patiently. Perhaps this is the secret of his perfect work, and the reason that no other people have been able to equal him. The result is a bird that looks as though it might sing or fly. The eyes are made of glass beads, and the bill and feet are painted so nicely that they appear to be part of the bird. Then he paints a twig or branch for it to rest on, or makes one from a leather, and his work is done.

ASBESTOS PLASTER.—For several years attempts have been made to produce a fire proof plaster for buildings. As heretofore used the wooden lathing has rendered the ordinary plaster objectionable. Metallic laths do not seem to answer such a desirable substitute as to kill all conditions. A contemporary says: We have lately noticed that a plaster is being made of asbestos, silicate of soda and potash, and without lime or hair, that answers very well. The chemical action of the ingredients forms a hard, stone-like substance, having great cohesive and adhesive qualities. So great is the latter quality that the plaster requires no key or hair to hold it firmly in place, even on the smoothest surface in use in building. Where it is put on iron surfaces, the plaster being an alkali, it has little tendency to produce rust. The adhesive quality of the plaster is such that it will stick so firmly to a plain surface as to require the use of a chisel to separate it from the metal. This plastering can be laid in the coldest weather. If this new material is all that its friends claim it to be, it is certainly something very valuable.

WATER TIGHT BRICK.—A brick being porous, as a lump of sugar, and having six sides, needs careful filling for water tight work in cesspools, etc., and a thin grout of portland cement is commonly used. Heating the brick and soaking before hand in thick coal tar has been recommended. A man may lay common wall all his life without learning how to make brick water tight.

TO KEEP MILDEW FROM WOOD AND CLOTHING.—A solution composed of alum two pounds, water sixty pounds, blue vitriol two pounds, gelatine one pound, acetate of lead one-half pound, thoroughly mixed, will prevent mildew from affecting any wood, clothing, fabrics, etc.

PAPER FROM SEAWEED.—An ingenious Japanese has discovered a process of making paper from seaweed. It is thick in texture, yet sufficiently transparent to be substituted for window glass. When colored it makes an excellent imitation of stained glass.

GOOD HEALTH.

WORKING IN HOT WEATHER.—The Boston Herald joins the New York Sun in combating the widely-prevalent mistake of stopping all exertion when the thermometer rises above the temperate. "Horses," says the Sun, "trot best on the hottest day, and men who have occupation for their bodies and minds fare better in warm weather than those who fold their hands and think of nothing but the temperature." With this the Herald is in complete accord regarding men whose physique is kept in as good condition as that of trotters, but makes exception for men who are not in good training, and for all during humid, debilitating weather. Excellently continues the Herald: "There is no doubt that good intellectual work may be done in the dogdays. The heat opens the pores and gives the body a chance to free itself of impurities through profuse perspiration, which in this age of riding, coddling and luxury it too seldom gets at other seasons, among men of sedentary lives or intellectual pursuits; and whatever purifies the blood helps the brain. The decree to man, 'in the sweat of thy brow shalt thou earn thy bread,' was a blessing, not a curse. And to a cheerful mind and healthy body, hot weather work is more conducive to comfort than is a lazy, a fretful 'stew' about the state of the mercury. Occupation is a panacea for most of the troubles of life."

THE HANDS.—The hands, like the face, require very little covering, while, on the contrary, their usefulness is apt to be somewhat interfered with by gloves. The blood supply of the hand is liberal, and the circulation within it free, and it is thus well able to resist ordinary cold, and to be indifferent to ordinary fluctuations of temperature. Except in quite cold weather, gloves may be regarded as rather ornamental than as necessary to a perfect attire. The continual wearing of tight kid gloves must somewhat impair the circulation of the part, and render the hand attenuated by discouraging the proper use of its muscles. A white and emaciated or "delicate" hand is, however, at the present time admired in ladies, and there is,

therefore, some reason for constant glove wearing. Individuals with feeble circulations, as well as those who are liable to chilblains on the hand and to chapping on exposure, are obviously more in need of some hand-covering than are persons in perfect health. According to Dr. Buck, silken and woolen gloves are more apt to lead to chapping than are gloves made of kid or dog skin. The kid glove, by the density of its structure, affords protection against wind, but as a protection against cold it is comparatively valueless.—*Herald of Health.*

HOW SOME FOLKS EAT.—"There is a class of people who progress with a meal something after this fashion," writes Margaret Sidney in *Good Housekeeping*: "A long draught of coffee, tea, milk or water, as the case may be, begins the performance; this is followed by a mouthful of something solid; only a mouthful, however, for the stream is turned on again down the throat. A glass of water disappears; then the food is attacked and voraciously; again the stream. Once more attention is given to the food, but always the stream has the first consideration. We silently ask and wonder how long the man can stand it. To say nothing of the utter disregard of the laws of health in thus eating and drinking simultaneously, it is an absurd spectacle! A tired, over-heated man drinks twice as much water as he needs, first, because he is so tired he doesn't know what he is doing till he sees the bottom of the glass; the second, because his blood is at boiling mark and the sudden chill is delightful, and he would prolong it till his capacity to swallow fills out. For the same reason he drinks rapidly, that the succession of chills may lower his temperature as speedily as possible. And then he goes out to his stable: 'John, be sure to give Black Prince no water just yet. Rub him down well, John, and cool him off slowly.'"

THERAPEUTIC VALUE OF COAL TAR.—In the *Journal des Usines a Gaz* are given some particulars derived from investigations made to ascertain the effect of coal tar and its derivatives upon the health of the workmen employed in the preparation of those substances. These inquiries were made chiefly in connection with the employees of the Paris Gas Company. It was found that those whose duties did not necessitate a prolonged stay in the parts of the works where tar was to be found, were liable to all kinds of ailments and formed a considerable proportion of the number of the sick list—while among the workmen specially occupied with tar only three were sick in the course of seven years; this result, medically considered, is all the more striking in view of the large number of workmen employed at the period in question—more than 20,000, of whom nearly 800 were employed in some occupation connected with tar. At the Bayonne Gas Works, too, the records show not only an exemption of the workmen from cholera, but also their immunity from skin diseases.

INSANITY AND DRINK.—Statistics show that one-quarter of all the insanity in the world, and in Paris one-half, is caused by drink. In the department of the Seine, in France, there are six times as many lunatics as there were in 1801, while this population is only three times as great. The chief of this "physical" causes producing mental disease is excessive drinking, which is responsible for 562 cases out of the 1,067 admitted in the year. Of the "moral" causes "domestic trouble" stands first, with 59 cases, and after it in order come money losses, alarm, surprise, domestic affliction and religious mania, which last appears to be comparatively rare in Paris. That it is everywhere; drink leads as a cause of disease and crime. The drink curse is more fatal to human welfare than war, famins and pestilence combined.

TOBACCO SMOKING.—A letter in the *Lancet* says: "As the merits or demerits of tobacco appear to be coming to the front again for discussion, I think the following question worthy of attention, viz., How far the injurious effects of tobacco are entailed upon the offspring of smokers? I can call to mind several families of my acquaintance who are delicate, whose fathers were great smokers. The effects of tobacco on the heart and muscular fiber generally are clearly shown in the instances referred to, in an annotation which appeared lately in your columns as having been practiced years ago for the reduction of hernia and dislocations. May not the cases which come before the profession daily of delicate hearts in children be traced to this cause?"

RHEUMATISM AN INFECTIOUS DISEASE.—Rheumatic Acute rheumatism is regarded by many as being caused by germs, just as fever is. The germs cling to houses built on damp ground and rooms where the sun does not shine. In the chronic stage a change to a dry, sandy soil and a warm climate is most desirable; but where this is impracticable a sunny room in an upper story, warm clothing, bathing with much friction, and, if possible to obtain them, Turkish baths prove most efficient means of cure.

LADY PHYSICIAN LUNATICS.—It is reported that one-third of all the lady physicians in England have broken down in the health of the brain and had to be sent to the asylum. This is probably a false statement given out to frighten women from the study of medicine. At least such is not the case in this country.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MOORE.—*Ledger*, Feb. 6: A fine ledge, four feet wide, was struck in the drifting operations at the lower level on Wednesday. The ore is of the regular ribbon character, and shows free gold in abundance. The 10-stamp mill, which has undergone a thorough overhauling under the direction of that veteran mechanic, Robert McLalan, was started on its career of crushing on Thursday morning. It works charmingly in every part. As there are several entirely new features in the construction of this mill, which are believed to be decided improvements, we shall take an early opportunity to describe them fully. The owners of the Moore are now more confident than ever that it is destined to a long and profitable career of gold production.

LAMBING MINE FLOODED.—At 2 o'clock Sunday morning the Lambing gravel mine on Dry creek was flooded. At the hour named a large portion of the levee was pushed inward by the pressure of the flood, and in a twinkling the greater part of the creek's torrent was rushing into the immense pits. The mammoth steam derrick, which represents aalue of between \$4,000 and \$5,000, was saved by being drawn to high ground, a truck having been previously laid for the purpose. Two of the large pumps were also saved, but a third one, which was erected but a few weeks ago, was lost. The mine of late has been paying splendidly, and the flooding of it at the present time is a severe loss. It will be impossible to do anything with the mine till next spring, but then it will be opened up again on a large scale.

MISCELLANEOUS.—The sulphurets at the Amador Queen mine are being hauled to the Sutter Creek reduction works. There is a large amount of them, but they are said to be largely mixed with sand, and consequently will average very low in value. A number of hands at the Mammoth mine were laid off this week, and the mill has come to a standstill for lack of ore. A few men are kept at work prospecting. The future of the mine depends mainly on whether the big tunnel reveals a ledge of pay rock far below the present workings. This tunnel is now 150 feet from where it is expected to strike ore. The gravel claim of J. T. Wheeler is said to be turning out remarkably well this season.

SUTTER CREEK.—The break in the tunnel of the Amador canal, which occurred last week, has been repaired. About fifty-five feet of the timbering gave way. Other repairing in the same vicinity was looked after at the same time. Contrary to expectations, the supply in the reservoirs was not equal to the emergency, and considerable machinery was brought to a standstill, and some had to take to steam. Everything is now running by water again. The supply of wood at the Eureka was exhausted some time ago, and they have been compelled, notwithstanding the terrible state of the roads, to continue hauling every day. Fortunately, they have found small quantities in or near town, which will perhaps run them until the roads improve. The Amador sulphurets works started a few days ago, and will probably run through the winter.

Calaveras.

RED GRAVEL.—*Mt. Echo*, Feb. 5: Rich gravel is being extracted from the Jack Rabbit mine at Dogtown. The extent of this body is not known, but is supposed to be immense. The Bully Bully gravel mine at Monarchville is making a splendid showing at present, and bids fair to become a good paying property in the near future. One day last week Mrs. Moralis, residing at Carson Hill, met with a lucky find in the form of a quartz specimen weighing in the neighborhood of twelve pounds. The rock is a piece of "float," and is immensely rich, being literally speckled with gold. Mrs. Moralis was offered \$300 for the specimen, but refused it, believing that it contained more than the above amount. She has since proceeded to pulverize it.

SHEEP RANCH.—*Cor. Calaveras Chronicle*, Feb. 6: The prop and mainstay of the inhabitants of the town is one mine, that, since its discovery in 1867-8, has become famous as one of the richest and most extensive mines of the county. At present the mine is owned by J. B. Haggin & Co., of San Francisco. The shaft at the central hoisting works is now 800 feet in depth, and the shaft for the 900-foot level has recently been commenced.

El Dorado.

GEORGETOWN.—*El Dorado Republican*, Feb. 5: There are no quartz mines being worked in the immediate vicinity of the town. The Gopher quartz mine near Kelsey is being worked, and report says very successfully. The Slate Mountain quartz mine is the mine on this divide; there is no diminishing of its productions. The three owners have a bonanza; they have shown what perseverance and industry can do in developing a mine. Mr. McKenley, a former resident of Placerville, and Messrs. Burnham and Holt, of San Francisco, are prospecting a mine on North canyon, in which they have great confidence. It is quartz and a deep bank of porphyry. They are putting up a two-stamp mill to thoroughly prospect it before putting up a larger mill. It was reported that the Taylor quartz mine was to be reopened and worked, but nothing has been done on it to the present time. Some work is being done on the Esperanza mine near Garden valley.

Fresno.

PLACER AND QUARTZ.—*Cor. Examiner*, Feb. 8: That portion of Fresno county lying between the San Joaquin river and the Chowchilla river, in which are the Fine Gold and Coarse Gold creeks, the Fresno river and their tributaries, have all been rich in placer gold. The diggings being shallow, they were once worked by rockers and tons, which are yet used, and, water being scarce, mining has been carried on only during the rainy season. Coarse and Fine Gold creeks cannot be depended on for water for more than nine months in the year. The Fresno river, though a longer and much larger stream, does not afford water for more than eight months in the year. I have prospected for quartz in that portion of the country lying between the two creeks named to the head of Potter's ridge, then down the Fresno river, embracing the Coarse Gold, Fine Gold, Potter's ridge and Fresno mining districts, and one would be

astonished at the amount of placer mining done by rockers. Every gulch and ravine shows the evidence of mining by rockers and tons. In following the gulches up you come to where the mining abruptly stops, and there you will generally find a quartz ledge either crossing the gulch at right angles, or only on one side of the hill, showing that the gold must have been washed down from these ledges. From the reports of the old miners who still hang on in that section, it was once very plentiful. Fine Gold creek has been very rich in its yield of gold. In places the quartz is strewn for miles over the surface, and the lodes generally have bold croppings, that may be traced for miles, and prospects may be obtained from most any piece taken. The general course of these ledges is a few degrees east of north and west of south. Their dip is a little south of east, having well defined walls, both foot and hanging, with heavy clay gangue on either wall. Having personally visited the Abby (now the Payson), Hildreth, Hanover, Cunningham, Smith, Quartz Mountain, Mountain View, Oro Fino, Hampton's, Last Chance, Harber, Texas Flat, Enterprise, King's Gulch, Gambetta, Red Rover, McDonald Brothers' mine, Butterfly, Lady Ellen, and many other mines on Willow creek, I can say that all give promise of being good mines, and a great many are now giving good returns to the owners. These mines are all in Fine Gold and Potter Ridge districts. In the Fresno district is the Roils mine, a very heavy sulphur vein. This mine is near the junction of the Coarse Gold and Fresno river. Its quartz is worked by an arastra run by water power. Mr. Marshall, also the Baker Bros., have a very fine ledge of high-grade rock. The Yosemite mine has a shaft down eighty-four feet, showing a fine vein of ore in the bottom of the shaft, with well-defined croppings on the lode. Within six hundred yards west from Green's Station is the Zebra mine, which has more development on it than any other mine in Fresno district. There are three claims of fifteen hundred each and one of seven hundred and seven feet. This mine has two tunnels, respectively seventy-five and one hundred and sixty-five feet. Three shafts have been sunk to the depth of sixteen, forty-five and thirty-two feet, all showing a vein of quartz in every shaft and tunnel from ten inches to three and a half feet. Already there is at the upper tunnel two hundred and fifty tons or more of quartz showing free gold and sulphurets that will work thirty to forty dollars per ton. There is about six hundred tons of ore in sight in the uppermost tunnel. The quartz is very heavy in sulphurets and the assays run from \$129 to \$135 per ton. This property is now incorporated under the name of the Zebra Mining and Milling Company, and the principal place of business is San Jose. The company intends putting a mill on the property immediately. This mining region of ours has a fine climate, pure water, and its hills and mountains are covered with rich grasses; abundance of timber of different kinds; pine and oak, below the snow belt; good roads accessible at any season of the year; cheap freight, and only twenty-five to forty miles from the railroad.

Inyo.

DEFIANCE.—*Inyo Independent*, Feb. 6: The Defiance mine is showing up better than ever, and with every advance made the ore body increases in magnitude. Mitchell's teams are steadily employed hauling ore from the mine to Keeler. A letter from Darwin states that Eddy has struck rich gold at Slate range. Samples of the ore brought in to Darwin are very rich.

MODOC CON.—The ore body in Lookout is still opening up. From foot to hanging there is four and one-half feet of clean ore. Daily output five tons. The usual amount of high-grade ore is being extracted from No. 3 Con. and South Lookout. Will start furnace as soon as sufficient material is on hand. Thirteen miners employed.

THE YGNACIO MINE.—*Inyo Register*, Feb. 6: Preparations are about complete for working this notable old Cerro Gordo mine for all it is worth. The old dumps, which are known to contain large quantities of good milling ore, are to be thoroughly overhauled. A system of thorough assaying will be carried out under the direction of S. D. Woodhull, than whom we have never had a more accurate assayer in the county, and all ores that will pay will be sent to the Hawley mill at Keeler. Work is now being prosecuted about 40 feet below the level of the Potosi tunnel, and with very encouraging results. Ore from the old upper workings will be sent down the deep incline to the Potosi tunnel, with which connection has been made. This will greatly facilitate the work, as no hoisting will have to be done. We are told that on the whole the prospects for the old mine are very flattering, and will wake things up generally before long. The company will be known as the Ygnacio Consolidated Mill and Mining Co. The general direction of the underground work will be under the management of Mr. Geo. Weiss, and the selection of ores, assaying, etc., devolves upon Mr. Woodhull, whose office is at the Ygnacio dwelling.

MINERS' ELECTION.—At the election last Monday, H. A. Man was unanimously elected Mining Recorder for Bishop Creek mining district. This district extends from the Mono boundary south to Big Pine creek, and from the foothills of the Sierras east to the summit of the Inyos.

THE HAWLEY FURNACE.—This institution, under the management of John S. Gorman, has been running right along since the 11th of last month, turning out six and seven tons of bullion every day. The string of ore teams to be seen climbing the heavy grade to Cerro Gordo every morning lends an air of old-time cheerfulness to that region, and, no doubt, the dulcet tones of the gentle teamster, as he prods his straining mules along, is sweeter music to the old resident than that of a tramp brass band.

Mariposa.

FRANCIS.—*Cor. Mariposa Gazette*, Feb. 4: The waterwheel at this mill is a five-foot Pelton wheel making 80 revolutions per minute. It is run by water taken from the ditch by an iron pipe 13 inches in diameter, having two nozzles with a fall of 40 feet and everything about the mill is working beautifully. I was very much surprised to see what an amount of work had been done in such a short time. They have an upraise about 100 feet from the mouth of the tunnel; said upraise runs to the surface; following the ledge a distance of 130 feet the tunnel is about 150 feet beyond the upraise, making a total length of 250 feet. The quartz not only looks well but prospects splendid. They have also a crosscut running west directly under and

parallel with the upraise, a distance of 70 feet, and have struck a ledge which looks well. They are already in the ledge nine feet and no sign of foot wall; they are also building a trail roadway from the mill to a mine below known as the J. D. B., from which mine the mill can be kept running for a long time by four men.

Nevada.

THE COE MINE.—*Grass Valley Union*, Feb. 2: A visit to the Coe yesterday morning showed that the work of opening the old mine was going on in a systematic manner. The lessees of the mine have their water wheel in place, and will have the pump set, and be ready to commence pumping water next week. The wheel is not a very large one, but the lessees think it will keep the shaft free from water, as the ground is not very wet. The machinery is placed over the eastward shaft, which is about 100 feet in depth, and a large ledge shows in the westward drift at the bottom. The Coe, like many other of the dormant mines of the district have proven when worked in a systematic manner, is likely to be a good mining property, and the chances are that it will add one more dividend paying mine to this district. Should it prove as good as there is every reason to believe it to be, the Powning, adjoining the Coe on the east will again be worked. The outlook in that portion of the district is certainly favorable.

AN IMMENSELY RICH STRIKE.—*Grass Valley Union*, Feb. 10: A visit to the Crown Point yesterday afternoon was rewarded by a sight of one of the richest lot of gold specimens ever seen in Grass Valley District. The specimens in question were taken from the slope of the 180 foot level yesterday forenoon, and of a different nature from those taken from the mine on former occasions. The gold is very heavy, being distributed through the rock in solid metallic strings, varying in thickness from a sheet of paper up to an inch or more. The precious metal is not confined to quartz alone, but is seen running all through the slate and soapstone, and no less than \$2,000 were taken from a small portion of the ledge. A great deal more of the same kind has been broken loose, and was to have been sent to the surface during the afternoon. The rock now being run through the batteries is also very rich, and will go far above the average of the last two or three weeks. The work of lowering the pump to the 300 level is progressing, and it will not be many days before that level is free from water, when the southeast drift will be driven as fast as drills and powder can do the work. The whole appearance of the mine is improving as work progresses, and it will not be long before the Crown Point will be classed as one of the best mining properties in the State.

Placer.

DRIFT MINES.—*Virginia Chronicle*, Feb. 5: Col. E. D. Boyle and Robert Kauhut have had a 60-horse power hoisting engine built at the Fulton foundry for the Alta placer mine near Alta station, California, on the line of the C. P. railroad. The engine, together with the mine cars, cages, tanks, cables, etc., will be shipped to their destination next week. The cages were constructed purposely for the shaft, it being smaller than those on the Comstock. The above mentioned gentlemen own the property, and are sanguine that it will pay them handsome monthly dividends as soon as they get everything in running order. The gravel hoisted through the shaft is drifted from the channel of an ancient river bed, the bedrock of which is 200 feet below the surface. The gravel contains an average of \$2 per ton in coarse gold, and they intend to raise and wash between 300 and 400 tons every 24 hours. The cost of drifting, hoisting and washing that amount of gravel is estimated at \$50. This will leave the owners a handsome margin, if they realize only fifty cents in coarse gold from every ton raised and washed. They have a splendid sluice head of water for washing the gravel, which is dumped into the flume from the car when hoisted from the drift, thus saving the expense of hoisting it over again.

WORKING SMOOTHLY.—*Placer Argus*, Feb. 4: Col. Keown, superintendent of the Hazard mine near Michigan Bluff, reports everything working smoothly and satisfactorily. The water has been out of the mine for over two months, since which time a good deal of work has been done cutting down the shaft, squaring and timbering it for the new cage recently put in. About 3000 feet of iron air-pipe has been supplied to the mine, and the workmen are now driving ahead on the main tunnel. The work goes on night and day, three shifts of men being employed. Capt. Hodge, Jas. Hodge and Wm. McCoy are building a new quartz mill on Owl creek near Yankee Jim's. It is to comprise two batteries, which will operate on a new principle by crushing and rubbing rather than pounding the rock from their seven-foot vein. It is said to be an improvement over the time-honored quartz-crushers. They have also put up a 32-foot water wheel. The mill will be ready for operations in a few days.

Shasta.

QUARTZ DISCOVERIES.—*Shasta Democrat*, Feb. 3: Two new rich gold quartz discoveries on Squaw creek are reported to have been made last week. The quartz mill and other machinery for the Croesus mine on Squaw creek is expected to arrive in a few days. F. B. Simonds Sr. is working on the Senior mine on Squaw creek, owned by himself and Barnes, and reports striking a pay chute of rich ore. Hart, Day & Co., who purchased the Fleming mines in Old Diggings district, have got their fine mill running in tip-top shape and are now crushing high-grade ore. Two carloads of selected ore was shipped a few days ago from the Scheerer tellurium mine on Salt creek to the Argo Smelting Works at Denver. Work will be resumed on the mine in a few days. This ore is designed as a working test.

GOOD CLAIMS.—*Shasta Courier*, Feb. 6: Mining near town is all the rage since the storm. Several young men have some good claims and as long as there is sufficient water for sluicing the boys make very good wages. The Decker bonanza on Bulgin Gulch, east of Centerville, will make a big racket in the mining world before many months elapse. The ledge matter is from sixty to three hundred feet in width and assays over \$100 to the ton in gold and silver. A shaft has been sunk on the ore body to the depth of sixteen feet, but the water came in so fast that work had to be suspended for the present. Joseph Decker, the discoverer, is a pioneer Californian, owns property in San Francisco, Plumas county, New River and other places.

Trinity.

NEW RIVER.—*Humboldt Standard*, Feb. 4: We were shown two specimens of gold-bearing quartz from Methodist creek, in the New River region. One of them, in the estimation of old miners, would turn out \$100 to the ton, and the other all the way from \$1000 to \$5000. It is safe to say there is not any too much of the latter rock there. We are informed also that a mine on Know-nothing creek has a rich ledge which yields an average of \$150 a day. The miners have an arastra and are prosperous. New River is not dead but sleeping.

NEVADA.

Washoe District.

CHOLLAR.—*Enterprise*, Feb. 6: Building up the pump column from the tank station on the 3100 level to meet and connect with the Cornish pump on the 2900 level is completed and the pump was started into active operation last night. This will give required facility for sinking the Combination shaft deeper, and that operation will be commenced or resumed as soon as official advices are received to that effect from headquarters in San Francisco. As before stated, the bottom of the shaft is 55 feet below the 3100 level. Meanwhile preparations are being made to resume drifting south on the 3100 level into Potosi ground. It will be remembered that the south drift was stopped a few weeks ago a short distance north of the Potosi line, because of an influx of hot water struck at that point. Drain boxes were put in throughout the drift to carry it off, and now an advance to the southward would be perfectly in order, and most certainly would penetrate a virgin block or section of the Comstock some hundreds of feet below all former explorations.

HALE AND NORCRUSS.—The deep winze which commenced on the 3000 level has now reached the 3200 level, following the regular dip or inclination of the ledge formation to the eastward. It has been in ore of greater or lesser degree of merit throughout, down to the present lowest level, which is the deepest yet achieved in the middle mining section of the Comstock. The winze is now being finished up and put into complete working order throughout, and next in order will be drifting south to meet the drift from the Combination shaft when it reaches that level. A drift north may also be started soon to investigate the good prospects developed by the diamond drill from the level 100 feet above.

OPHIR.—The main west drift from the old Mexican shaft on the 300 level is now in 136 feet, 32 feet having been added since last report. The lateral drift north on the 400 level from the main west drift from the old Mexican shaft is now in 226 feet, material vein porphyry and quartz. On the 700 level the joint Mexican and Union drift running northwest from the Ophir shaft is now in 245 feet, with no new features of interest to relate.

CON. CALIFORNIA AND VIRGINIA.—The usual amount of ore, about 300 tons daily, continues to be shipped from the 1750 and levels above, average assays from mill samples being about \$14 per ton. On the 1400 level the northwest drift has been extended 32 feet, making a total of 543 feet. The very gratifying dividend of thirty cents per share on this mine is more particularly mentioned elsewhere.

GOULD AND CURRY.—At the Osbiston shaft, owned and being conducted jointly by the Gould and Curry and Best and Belcher mining companies, the pumps have been doing very noisy and effective work since they started. Last evening the water was lowered in the shaft to the total extent of 146 feet with 46 feet further to go to reach the third line of pumps.

UNION CONSOLIDATED.—The main east crosscut on the 500 level is now in 592 feet and making good advancement in favorable working ground. The progress of the joint Mexican and Union drift northwest on the 700 level is mentioned elsewhere in the Ophir report.

YELLOW JACKET.—The Brunswick mill is kept steadily running on ore from this mine. The mine is looking and yielding as heretofore, with no new points of interest to make particular mention of.

SIERRA NEVADA.—The main lateral drift north on the 520 level has been extended 63 feet making a total length of 1638 feet. Material dry vein porphyry with streaks of quartz and clay.

MEXICAN.—On the 500 level the main lateral drift north from the east crosscut is in 405 feet. Material vein porphyry with streaks of decomposed quartz and clay.

ALTA.—The lateral drift on the 700 level toward the Benton ground is making steady advancement in good working ground.

CROWN POINT.—Ore extraction and milling run up to the usual standard.

MISCELLANEOUS.—The small outside mines and mills down Six-mile Canyon, Silver City and elsewhere, including the mills on Carson river, are now running all right.

Bell District.

DEVELOPMENT.—Belmont *Courier*, Jan. 30: Ernst & Esser are still pushing the work of development in their mines in Bell district, Esmeralda county. The mines of this district will attract considerable attention at no very distant day. The ores are of a smelting character, and the mines, as soon as properly opened, will produce a sufficient quantity of ore to keep two or three furnaces running steadily. Nevada has more mines than any other State in the Union, and all they want is a fair show and they will speak for themselves.

Como District.

COMO-EUREKA.—*Virginia Enterprise*, Feb. 7: Bennett Symons, was in the city a day or two ago, direct from Como. He brought in some samples of ore from the Como-Eureka mine, from which four assays were made with the following results per ton: \$27.47, \$29.58, \$82.43 and \$173.93. The proportion of the gold to the silver is about 40 per cent, like the general average of the Comstock ores. This good result was from wheelbarrow samples, the ore coming from the winze sunk below the 150 level. A handful of the ore is taken from each wheelbarrow load that comes out and thrown into a box, thus giving a fair average of the ore extracted. The last mentioned and highest assay, however, was from a good-looking single lump of ore. They are working hard to get out ore enough for a milling run, which they feel assured must be a paying one. In the North Rapidan they are extracting and sorting ore from the

upraise above the 160 level, and accumulating for another milling run when the state of the road will allow of hauling to Dayton. This raise is up 75 feet in good ore, showing no wall on either side. The great mass is of low grade, with streaks and bunches of rich black sulphurets. There is many a thousand dollars in sight, and the average of the ore worked thus far—\$31 per ton—proves it to be the first really paying mine in Como, although the Como-Eureka will, no doubt, follow suit in that respect.

Columbus District.

HOLMES.—*True Figure*, Feb. 3: In the Cross development we are getting some good ore. Sixty feet west of Cross development we have a good slope of ore. It is developed to a length of 40 feet and will average two feet wide. The Creer looks exceedingly well. The slope is increasing in length. It is 12 feet wide and the ore is good milling. The drift running west from the Creer looks well. The silver stop, fourth level, looks well. We have 20 inches of good sulphure ore at this point. We have changed from mill No. 2 to mill No. 1. We are running the battery to 102 drops with seven and a half inches fall, and we think we will be able to work 55 to 60 tons per day. The mill is doing splendid work—we think better than it ever did.

MOUNT DIAULO.—Cutting out the station and shaft for the eighth level. The south crosscut from the west drift on the fifth level is in 27 feet and we are taking out a little \$30 ore from a streak cut by this crosscut. In the intermediate between the fourth and fifth levels we are drifting on a small streak of \$200 ore that looks promising. The drifts from the mine east of the shaft between the fourth and fifth levels both show a little ore of high grade. We are raising on the ore above the west drift. On the fourth level the raise is now up 22 feet and shows two feet of \$60 ore. The raise from the intermediate drift between the first and second levels near the Callison mine is up 66 feet. This raise has shown about three feet of \$50 ore for the last 40 feet and the face now shows about this amount of ore.

Ione District.

PROSPECTING.—*Belmont Courier*, Jan. 30: There are still a few chloriders taking ore out of the mines of Ione. Their faith is strong that that camp will be a daisy some day.

AT WORK.—*Belmont Courier*, Jan. 30: R. C. Langworthy continues the work of development in the Indianapolis mine at Ione.

Jefferson District.

ORE.—*Belmont Courier*, Jan. 30: Work in the Great Mogul mine, Jefferson, is progressing steadily and some very nice looking ore is being extracted.

Manhattan District.

PROGRESS.—*Belmont Courier*, Jan. 30: Work is progressing steadily in the mines of Manhattan district under the able superintendence of County Treasurer Adam McLean.

Northumberland District.

CHLORIDERS.—*Belmont Courier*, Jan. 30: Nothing is being done in the mines of Northumberland district. Chloriders might find a worse field to labor in.

Pennsylvania District.

A THREE-FOOT LEDGE.—*Pioche Record*, Jan. 30: From J. Penjade, who has just visited Pennsylvania district, we learn that G. K. Barton, who now owns the property, is pushing work ahead with much energy. The mine shows a three-foot ledge of good free-milling ore, in a sort of granite formation, the ledge being very regular and well defined. Some two hundred tons of ore on the dump insure plenty of that material with which to start. Charley Koden, with five men, has about completed the half-mile road from mine to mill. The grading for the mill is completed, the engine-bed in place, and the battery block ready to lower into the pit near which it lies. Both engine-bed and battery block will be set in solid granite. With some trifling exceptions all the machinery is now on the ground. The mill will have five stamps and two large pans, its capacity being estimated at 8 tons or more per day. The amount of work so far done by comparatively a few men is surprising. It would be still more so were it not for the fact that Barton has selected with rare good judgment the best ore that could be had for each branch; and his employees seem to be as much interested as himself in making a speedy as well as a thorough job. The air of life and practical work that pervades the little colony is refreshing to a visitor from Pioche. The men are all healthy and their vigorous out-door employment gives an additional flavor to the splendid fare; for Barton and his men live on the fat of the land. Anyone visiting the district will find it to his advantage to stop over night at Dutch Flat, where the Mesdames Phil and John Smith provide most excellent entertainment.

Taylor District.

EEBERHARDT MONITOR.—*White Pine News*, Feb. 3: Such is the name of the English company into whose hands the Monitor mining and milling property of Taylor has been consigned by purchase. The property was sold last week for the sum of \$175,000. Capt. Frank Drake, through whose negotiations the sale was effected, is superintendent of the company and will manage its affairs here. Of his well-known qualifications for the position it is needless to refer. He has been identified with the mining interests of White Pine since the dawn of that industry. How soon he will commence active operations on the newly-acquired property we are not yet able to say, but it is probable he will resume work in the mine right away. The mine is in good working condition and looks better than at any time in the past. All the buildings, including the late owners' residences, went in sale, but Capt. Drake will not disturb the present occupants till spring.

Union District.

PROSPECTS.—*Belmont Courier*, Jan. 30: The prospects are good for work being done on an extensive scale in the North Belle and other mines of Grantsville belonging to Theodore Cirac. The mines are bonded to J. L. Sanford, of San Francisco, who proposes to open them in good style. The ores carry both gold and silver, some of the rock showing free gold. Union Mining District is under a cloud at present, but the day is not far distant when its mines will be handled as they ought to have been years ago. Mismanagement is the rock that knocked the stulting out of mining in Nye county. Capitalists who have money to invest in mines should be careful and send competent persons to attend to the working of them.

ARIZONA.

WINIFRED DISTRICT.—*Con. Phoenix Herald*, Feb. 4: The mining interests in this district look very bright. The Carbonate Hill mine, owned by Mr. A. J. Pugh, has now a shaft 50 feet deep on the ledge which shows a well-defined vein at the bottom 10 feet wide and between two good walls of porphyry and slate. This ledge has improved from the surface down, in both quality and quantity, and is now without a doubt a paying property and a permanent mine. Prospect results taken from average samples show well in free gold, and the mine is well situated for economical mining with good dumps, tunnels and shafts. In No. 2 shaft, 250 feet southeast from 50-foot shaft, a new ore body has just been exposed, which shows a vein of two feet wide of gold and silver bearing quartz. Samples taken from this ledge assayed \$290 gold and \$121 silver, with a total of gold and silver of \$347 per ton. The quartz looks well, of a bright character, shows some copper stain and considerable of red oxide of iron and carbonate of lead, and is located in good, solid porphyry formation. The Hidden Treasure, situated on the southwest of the Carbonate Hill mine, also shows some very fine gold quartz. Considerable work has been done on this claim in prospecting for the ledge, and until lately no ledge was ever discovered. The character of the ore is much the same as that encountered in the Carbonate Hill mine, and as soon as Mr. Taplin gets his affairs here in good shape he contemplates a trip to Rhode Island, rewarded by the Hidden Treasure and Carbonate Hill properties. There are some other good properties here which look very promising and prospect well in free gold.

FREE GOLD.—*Mr. W. H. Thomas*, who is working the Contention and other prospects out about 20 miles north of town, called at the *Herald* office today and exhibited some as fine samples of free gold as one will see in a lifetime. The gold in the rock, which is much decomposed, is native and takes on very much the characteristics of horn silver. The samples came from the Contention, and if there is much such rock in the mine, it will prove a most valuable gold producing property one of these days.

STRIKE.—*Prescott Courier*, Feb. 5: News comes through Mr. Spence, of Palace station, who came in to town yesterday, of a rich strike in one of the Morgan properties in Turkey Creek district. The mine in which the strike was made is the Victoria, from which some rich ore and a considerable quantity of horn silver were taken last year, while it was being worked by Mitchell and Campbell. Mr. Morgan, who owns the well known Pine Spring mine, lower down the creek, bought out Campbell's interest. The main shaft being down about seventy or eighty feet, Mr. Morgan and his partner concluded to prospect the ledge further south. Two men were accordingly put on to run a cross-cut into the vein, about forty feet from the shaft. After some days work they struck the ledge and found a pay streak fifteen inches across, averaging over two hundred ounces of silver to the ton, in chlorides and horn silver. The strike is about 200 feet north of the south extension belonging to Vanderbilt and Ross. John Hardy and John Wilderman who own the Etta mine, on Cherry creek, are about to put up a steam hoist on their claim. They have a shaft one hundred feet deep, with a large vein of free milling gold ore at the bottom and enough ore on the dump to run their hoist for some time. Mr. R. J. Cartmell, has purchased the Happy Jack mine and will immediately remove 100 tons of ore now on the dump to his Azilan mill. Messrs. Geo. C. Webster and Kidenour, owners of the Honda mine, Hassayampa district, have extracted to tons of rich ore which, we think, be worked by Mr. Cartmell. It is said that Mr. Douglas Gray started his Turkey Creek district mill. Mr. Dawes is tunneling towards the May Bean, and expects to find in it very rich silver ore. Del Pasco mill is crushing gold rock that pays fully \$50 a ton. Mr. Stahl, the assayer, told us, yesterday, that he is now handling a great deal of gold. The auriferous gravel of this country holds millions of dollars worth of gold, but owing to scarcity of water, save in certain months of the year, washing this gold out necessarily is slow work, until plans are devised for saving the water that goes to waste.

COLORADO.

LEADVILLE.—*Herald Democrat*, Feb. 4: Quite a number of prominent mining men are devoting considerable attention to the undeveloped territory embraced within the approximate course of the Iron Silver, Silver Chord and Colonel Sellers' ore chutes. These ore chutes, which as far as known, extend from Rock Hill northeasterly across Iron Hill, and passing through Adelaide Park, continue in their course across the upper portion of Yankee Hill. That this is the general trend of the ore bodies is demonstrated by developments in the Emmett and Crown Point mines on Rock Hill, the Iron Silver, Silver Chord and Colonel Sellers' mines on the southwest slope of Iron Hill, the Louisville and Colorado No. 2 mines, on the east side of Iron Hill, the Park and Mike and Starr mines, on the west slope of Breece Hill, and the Galesburg and other properties on the Big Evans Gulch slope of Breece and Yankee Hills. Between the productive mines above enumerated, there are still to be found extensive areas of undeveloped territory, which will unquestionably prove productive with proper exploration. Between the Louisville and Colorado No. 2 mines and the Park mine are the Horseshoe, Arctic, Laura Lynn, Lady Alice and other undeveloped lodes. After passing the Park mine, which to-day shows one of the finest typical ore chutes in this district, the Minnesota, Loveland, Keystone, Superior, Queen Consolidated, Andy Johnson, Onoto, Galesburg and other lodes are successively encountered. All these lodes and many of the adjoining ones should disclose good ore by sinking to a proper depth. Many of the properties are patented and contain shafts from 150 to 200 feet in depth, but all seem to have stopped just before reaching the desired ore zone. On the Atlantic, a few years ago, Mr. J. L. Loomis sunk the Keystone shaft several hundred feet, and encountered quite a body of ore that did not pay at the time, but which would now yield handsome returns. Realizing this fact, well-informed parties have begun the erection of hoisting works on the shaft, and in a few days will be actively at work and probably producing a good quality of shipping mineral. To the north and west of the Atlantic group is the Queen Consolidated, containing thirteen acres of patented ground of a very promising nature.

This property was located in 1879, but owing to litigation could not be worked until last year, when all controversies were adjusted and work resumed. A large shaft was sunk, which at 170 feet encountered quite a body of argentiferous ore running 20 to 60 ounces in silver to the ton. The shaft is now down 225 feet, and a short distance further would probably take it to the lower ore horizon, on which will be found the silver and lead ore deposits. No work is now being done on the property, the owners having been drowned out by water. While it will cost something to sink this shaft, the results to be anticipated are fully commensurate with the outlay. Almost adjoining the Queen Consolidated on the east is the Galesburg lode, under lease to Judge J. Y. Marshall and ex-Mayor J. D. Flening. This property has lately shipped some fair ore, and discloses a chute of mineral fair in silver and rich in lead, which leaves little doubt as to the extension of the carbonate of lead belt from Iron Hill to the northeastward of Big Evans gulch. The farther east the greater the depth to the ore horizon, as is proved in the Onoto and Andy Johnson lodes, situated to the northeast of the Queen Consolidated and Galesburg mines. The Andy Johnson, according to all reports, disclosed good ore in a drill hole, slightly below the depth of several of its neighboring shafts, and the Onoto, at 325, encountered sulphide of ore four years ago, when this mineral was considered too refractory to warrant treatment. Now it is being reduced at \$10 to \$20 a ton, and the reputation of the Foregang, Colonel Sellers, Minnie and Crown Point mines has since been built up on sulphide deposits, which, with few exceptions, have proved the most profitable in Leadville during late years. We are glad to note that Leadville people have taken an interest in this matter, and trust that the indications so promising to mineral will be found correct, and that a number of new mines may soon be added to the large list of ore producers in the Leadville district.

IDAHO.

LAVA BED.—*Shoshone Journal*, Feb. 5: A boom is expected in the new Lava creek mines, about 35 to 40 miles from Tikura station which expects to do the forwarding business of this lively camp as soon as the wagon road is completed and a daily mail line established. The new wagon road from Shoshone to Camas Prairie, Little Snooky and Rocky Bar, Atlanta, and new North Fork mining districts is progressing finely.

MONTANA.

SILVER MINES.—*Inter-Mountain*, Feb. 3: At present the cost of milling ores has been reduced to a very much lower sum than at the time when most of the silver veins around Butte were opened. Then lodes were abandoned as worthless, which can to-day be profitably worked. The result has been that many mines which have long lain idle are now being developed by lessees, and are yielding satisfactory profits. As a rule, the lessees are working on a small scale; but let them demonstrate the fact that the property they are developing is really valuable, and they will find no difficulty in raising sufficient capital to work it more extensively. We do not wish to convey the idea that the better known mines of the district are retrograding, but perhaps some of them have been as much over-estimated as some of the less developed mines have been under-estimated.

THE UNION CONSOLIDATED.—West of and but a short distance from the Moulton and Rising Star are the mines of the Union Con. Co., consisting of the Goldsmith No. 2 lode, on which a shaft is designated by the company as shaft No. 1; the Batchelor lode—shaft No. 2, the Nonesuch lode—shaft No. 3, and the Belcher lode—shaft No. 4. All these shafts have three compartments, and are covered by large shaft houses containing a complete outfit for pumping and hoisting. Every preparation is evidently being made for extensive work under ground. The timbering is unusually heavy and substantial. All the ore raised goes the Anaconda smelting works. The principal stockholder in the company is Mr. J. B. Haggin, of San Francisco, who is also the owner of the Anaconda and St. Lawrence mines. It is a well-known fact that Mr. Haggin never invests in mining property without being fully convinced by the best expert talent that the mines are valuable, and it is equally well known that when he does take hold of a mine that it is going to be worked in the best manner possible. All that money and skill can do to make it remunerative will be done.

THE AMY AND SILVERSMITH.—The Amy and Silversmith Con. Co., Mr. Lloyd superintendent, are working the Amy and Silversmith lode north of and nearly parallel to the Moulton. The main shaft is 500 feet deep. Last month they sent 180 tons of ore to the mills that averaged from 60 to 70 ounces in silver per ton, and also carried some gold. The first-class ore assays over 400 ounces in silver; this is not kept by itself, however, but is mixed with the lower grades. The mine is looking well, and when the new levels are run the output will undoubtedly be increased.

THE GOLDSMITH.—A short distance northwest of the Amy is the Goldsmith lode, which is owned and worked by George Tong. The east shaft is 260 feet deep, and levels have been opened at the depths of 150 and 250 feet. At present ore is being taken from the slopes between the two levels, and above the first one. About five tons are raised daily at this shaft. The west shaft is on the other end of the mine, about 1200 feet from the one just mentioned. Here they are sinking, and have already reached a depth of 200 feet. About 40 men are employed.

THE PACIFIC.—Messrs. Bateman & Grimes have leased the Pacific mine. Their shaft is on the south vein, and is 70 feet deep. From this they have drifted west 75 feet to the intersection of the south and middle veins, and their have a body of ore about 14 feet in width, which mills 20 ounces in silver per ton. They are running the old Lexington mill, of which Mr. Bateman has charge, and are crushing about 15 tons of ore a day. Their ore is free milling, so that they do not have to roast it.

THE FLAG.—The Flag mine is owned by the Silver Bow Company. Hallahan & Talbot have a lease of it, and are just getting fairly in shape to work. Last week they took the water out and are now prospecting the vein to ascertain the best place to begin work. The shaft is 150 feet deep, from which several levels have been run.

THE WILD BILL.—Jews, Hutton & Co., lessees of the Wild Bill, have their shaft down 235 feet and are drifting west from the bottom. They are also sinking a mine from the 135-foot level. The vein is about 20 feet wide and the pay streak has an average width of about six feet. The ore carries from 15 per cent to 30 per cent in copper, and from 15 to 30 ounces in silver per ton. They have a year's contract with the Orford Co. to supply them with 25 tons of ore per day, and are now hauling it to the mill site where the Orford Co. purpose to erect their new smelting works.

THE GREY ROCK.—Messrs. Saden, McKremmon & Coley have a lease on the Grey Rock mine. They are working on the middle shaft which is about 300 feet deep. Their work is at present confined to the 100-foot levels, which are about 400 feet in length and show a good body of ore. The middle vein carries silver ore, while the south one carries enough copper to render it a smelting ore; the former assays about 40 ounces silver per ton, and \$8 to \$15 in gold.

WAKE-UP JIM.—On the Wake-up Jim they are sinking between the 200 and 300-foot stations, and on the Diamond, which is worked by the same company, they are down 275 feet, from which point they are crosscutting south.

THE LEXINGTON MILL.—The Lexington mill has 25 stamps dropping, and is sinking for the 1000-foot station as fast as possible. The shaft is now about 870 feet deep. No new crosscuts or levels will be run until the 1000-foot station is reached. The Montana Co. have not started yet, though news that will set the mine and smelter going is daily expected.

NEW MEXICO.

ORE.—*Silver City Enterprise*, Feb. 6th: The Young Man Mine at Malone is shipping about one carload of ore a month. M. B. Mikesell brought in some very high grade ore from the Young Man mine at Malone Wednesday. A carload shipment of \$200 ore was made from the Black Hawk mine last Friday. H. A. Brigham is working the Sherman mine with fair results. He shipped a lot of ore to Deming this week. Johns and Dorn have quit work on the Cook's peak mines, and the latter properties are now being worked by other parties. J. B. Malone the owner of the Montana and Tenderfoot claims at Malone, while in town this week informed us he has a carload of ore out for shipment which he intends sending to Deming next week. The shipping ore from these claims averages about \$100 per ton. Hank Dorsey, one of the most extensively known prospectors in southern New Mexico and George Williams have struck a fine body of ore on a claim, west of the town on Legal Tender hill, from which they are daily taking out high grade shipping metal. Encouraging reports have come in daily during the past week from the Providencia mine in Chiricahua Pass, and with them some fine specimens of wonderfully rich ore. The property is under lease to James St. Clair and partner, Almer Enoch is employed in sinking a 100 foot shaft on the Arizona mine at Pinos Altos for working purposes. From the bottom he will cross-cut to the ledge, and then commence the extraction of ore.

LONE MOUNTAIN.—Considerable quiet work has been doing at Lone Mountain lately, and some good results have followed. Ore is being taken out, and shipments, though not large, are quite frequent. The work is being done by men who cannot afford to do any fancy or expensive mining; hence the greatest returns for the least expenditure of labor and money was sought for and generally gained. The numerous small or undeveloped mines of high and low-grade ore at Lone Mountain offer good investments to miners who are willing to take some chances. It has been shown that men can make money leasing such properties, and why this is not done to a greater extent than is the case remains a mystery. The mines are numerous, the veins and ore pockets frequent, and the comparatively low cost of getting the ore to market renders it possible to make a good profit on ore that would not by any means be considered high grade. In the Treasure mine, which is being worked by E. H. Bonner and Albert O'Brien, a rich strike was made on Wednesday last week. The new ore was struck at the outcrop of the vein, and since that time it has been sunk upon to a depth of about six feet.

OREGON.

QUARTZ AND GRAVEL.—*Jacksonville Times*, Feb. 6: Jack Layton is making the gravel fly at his mines on Farris gulch. Miners are happy at last, for there is plenty of water everywhere. S. McConnell and T. J. Neff have purchased Neil Bros. mining claim on Wagner creek. E. Manville has better prospects than ever in his claim on Forest creek and is sanguine of a big run. Many locations are still being made, and our county clerk has recorded quite a number of them during the week. Messrs. Cowles, Kenner and Slagle have located the ledge in Willow Springs precinct formerly worked by Benner & Co. Al. Sturgis has quite a force at work in his diggings on Jackass creek. Fred. Miller and S. L. Fielder among the number. There is not a great deal of snow, at least not as much as the miners would like to see on the mountains later in the season. Now that the quartz mill at this place is an assured fact prospecting has been renewed in this vicinity with renewed energy. The Dry diggings near Grant's Pass are being worked by different parties this season water being plentiful there as well as elsewhere. Ragsdale & Co.'s ledge near Fort Lane promises better results than ever, and they will soon have a large quantity of ore on the dump. Work is progressing favorably at the hydraulic claims of Wimer & Sons, Bybee & Hall, John Haviland and others in Josephine county. An extended run is assured the miners of Jackson and Josephine counties, which means plenty of gold dust when the cleanup is made in the late spring. The recent wet weather is not favorable for quartz mining and prospecting, but it suits the placer miners exactly. All will have their time, however. Several claims have been located on the extension of the ledge recently discovered by Col. Johnson, in Table Rock precinct. An assay of some of the ore showed \$550 to the ton, mostly in silver, it is said. The placers in Josephine county are among the best in the State, and some promising quartz ledges are also being prospected. The capital which ought to be expended in that section would be well rewarded.

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Mining Share Market.

The dividend of 30 cents per share of the Consolidated California-Virginia Co., on the Comstock, is the first since the consolidation of the companies, and is of great interest to the stock-dealing public. The Virginia Enterprise states that within the past few months the ore, especially in the lower part of the mine, has more than paid expenses, and given a continual accumulation of money into the treasury of the company, the amount of which was freely reported for public information. There was on hand February 1, \$96,445.92 in coin, and \$52,077.60 in unsold bullion, and it was stated that the clean-up and final bullion shipment on January account, yet to be received, would be large, therefore this dividend was the natural result.

The last dividend on California was fifty cents per share, December 22, 1879, and the last assessment, August 4, 1884, twenty cents per share. The last dividend on Consolidated Virginia was fifty cents per share, August 19, 1880, and the last assessment twenty cents per share, March 12, 1884. Total assessments levied on California, \$1,394,000; total dividends disbursed, \$31,320,000. Total assessments levied on Consolidated Virginia, \$1,113,200; total dividends disbursed \$42,930,000. Total assessments on the two mines, \$2,507,200; total dividends, \$74,250,000. The second and last assessment levied on Consolidated California and Virginia was twenty cents per share, January 15, 1885. There is a vast wilderness of low-grade ore remaining in the mine which would pay well with less cost of production and milling.

The 3,200 level has at last been reached in the middle mines by the Hale and Norcross deep winze, which commenced at the 3,000 level, and drifting north and south from the bottom of it will be next in order, to develop the good ore prospects indicated by the diamond drill in the level 100 feet above. Sinking the combination shaft deeper will be resumed shortly, but at present advices are awaited from below. So, too, with Chollar in projected operations on the 3,100 level. The drainage of the Osiston shaft of the Gould and Curry and Best and Belcher mining companies goes steadily ahead and with very satisfactory progress.

Bullion Shipments.

Oro Grande, Feb. 7, \$4150; Germania, Feb. 2, \$2529; Silver Reef, Utah (for January), \$29,307; Hanauer, 2, \$9890; Germania, 4, \$2532; Hanauer, 4, \$3240; Germania, 7, \$2907; Hanauer, 7, \$2905; Stormont, 7, \$2750; Con. California and Virginia, 6, \$64,136. Following were the ore and bullion shipments from Salt Lake City for the week ending Feb. 6th: 16 cars of bullion, 406,645 pounds; three cars of ore, 76,890 pounds.

Testing and Working Silver Ores

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has been issued by Dewey & Co., Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, extraction of lime, chloride ores, amalgam, Fletcher's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroehnke's process, etc. Under "Pulverizing Machines" are described the arrastra and its construction and operation, stamp batteries, s-reens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noyes's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough barrel on rollers, Aaron's amalgamator, separator, etc. He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

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Peerless M Co.	Arizona.	6.	21.	Jan 11.	Feb 12.	Mar 2.	A Waterman. 309 Montgomery St
Pear M Co.	Arizona.	4.	10.	Jan 11.	Feb 12.	Mar 6.	A Waterman. 309 Montgomery St
Pine Tree M Co.	California.	1.	15.	Dec 23.	Jan 27.	Feb 15.	C A Huntington. 309 California St
Savage M Co.	Nevada.	65.	50.	Jan 4.	Feb 9.	Mar 1.	E B Holmes. 309 Montgomery St
Sierra Nevada M Co.	Nevada.	81.	55.	Feb 9.	Mar 15.	Mar 1.	E L Parker. 309 Montgomery St
Union Con M Co.	Nevada.	32.	25.	Jan 11.	Feb 15.	Mar 8.	J M Buttington. 309 California St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Iowa M Co.	California.	C C Leavitt.	510 Battery St.	Annual.	Feb 23
Murchie & S M Co.	California.	W L Oliver.	328 Montgomery St.	Annual.	Feb 16

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Caledonia M Co.	Nevada.	W L Oliver.	328 Montgomery St.	10.	Feb 23
Con Virginia & California M Co.	Nevada.	A W Hayes.	309 Montgomery St.	30.	Feb 12
Derbec Blue Gravel M Co.	California.	T Wetzel.	322 Montgomery St.	10.	Feb 9
Holmes M Co.	Nevada.	C E Elliott.	309 Montgomery St.	25.	Feb 21
Jackson M Co.	California.	D G Bates.	419 California St.	25.	Oct 5
Manhattan S M Co.	Nevada.	John Crocker.	328 Montgomery St.	25.	Feb 3
Silver King M Co.	Arizona.	J Nash.	328 Montgomery St.	25.	Feb 15
Syndicate M Co.	Nevada.	J Stadfeld Jr.	419 California St.	10.	Dec 21

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GORUM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.			Red Bluff.			Sacramento.			S. Francisco.			Los Angeles.			San Diego.		
	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.
Feb. 3-10.																		
Thursday .....	.00	60 SE	CL	.00	60 N	CL	.00	52 SE	CL	.00	61 NE	CL	.00	75 E	CL	.00	68 NW	CL
Friday .....	.00	54 NW	Fr.	.00	57 SE	CL	.00	52 SW	Oy	.00	54 NW	Fr.	.00	75 E	Fr.	.00	69 W	CL
Saturday .....	.00	48 SE	Oy	.00	54 S	Oy	.00	53 SE	Oy	.00	57 SE	Fr.	.00	74 E	CL	.00	68 W	CL
Sunday .....	.14	45 Cm	Cy.	.00	55 S	Cy.	.00	52 S	Cy.	.00	60 S	Fr.	.00	73 W	CL	.00	63 NW	Fr.
Monday .....	.16	46 S	Cy.	.00	58 N	Fr.	.20	50 NW	Cy.	.00	58 NW	Fr.	.00	61 S	CL	.00	64 W	CL
Tuesday .....	.17	52 S	Cy.	.00	60 E	Cy.	.00	58 NW	CL	.00	60 W	CL	.00	72 SE	CL	.00	62 W	CL
Wednesday .....	.23	60 S	Cy.	.00	63 NW	CL	.00	58 NW	CL	.00	60 NE	CL	.00	80 W	Fr.	.00	72 NW	CL
Totals .....	.75			.00			.20						.00			.00		

EXPLANATION.—CL, for clear; Cy, cloudy; Fr, fair; Fy, foggy; — indicates too small to measure. Temperature wind and weather at 12:30 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 21.	WEEK ENDING Jan. 28.	WEEK ENDING Feb. 4.	WEEK ENDING Feb. 11.
Alpha .....	.30	.35	.30	.35
Alta .....	.20	.20	.25	.10
Argenta .....	.15	.15	.15	.15
Belcher	1.00	1.00	1.05	1.10
Belding .....	.80	.85	.60	.50
Best & Belcher .....	.80	.85	.60	.50
Bolton .....	.40	.20	.25	.25
Bonanza King .....	.15	.15	.15	.15
Belle Isle	1.70	1.80	1.65	1.80
Bodie Con. ....	.15	.15	.15	.15
Benton .....	.15	.15	.15	.15
Bulwer .....	.45	.50	.40	.45
California	1.90	2.10	2.00	2.30
Challenge .....	.15	.15	.15	.15
Champion .....	.40	.35	.35	.50
Chollar .....	.80	.90	.90	.95
Confidence .....	.80	.90	.90	.95
Con. Imperial	1.90	2.10	2.00	2.30
Con. Virginia	1.90	2.10	2.00	2.30
Crown Point .....	.80	.90	.90	.95
Day	1.15	2.50	2.20	2.25
Eureka Con.	1.15	2.50	2.20	2.25
Eureka Tunnel .....	.15	.15	.15	.15
Grand Prize .....	.75	.80	.70	.70
Gould & Curry .....	.75	.80	.70	.70
Goodshaw	2.15	2.50	2.35	2.45
Hale & Norcross	2.15	2.50	2.35	2.45
Holmes	10	10	10	10
Independence .....	.10	.15	.15	.15
Julia .....	.10	.15	.15	.15
Justice .....	.10	.15	.15	.15
Martin White .....	.35	.40	.30	.35
Mexican .....	.35	.40	.30	.35
Mt. Diablo .....	.35	.40	.30	.35
Northern Belle .....	.10	.10	.10	.10
Navajo .....	.10	.10	.10	.10
North Belle Isle .....	.10	.10	.10	.10
Occidental .....	.80	.80	.80	.80
Ophir .....	.60	.70	.50	.50
Overman .....	.15	.15	.15	.15
Pinal Con. ....	.35	.40	.35	.40
Potosi .....	.60	.65	.60	.65
Savage .....	.60	.65	.60	.65
Seg. Belcher .....	.25	.35	.40	.45
Sierra Nevada .....	.25	.35	.40	.45
Silver Hill .....	.40	.45	.40	.45
Silver King	8.25	7.60	7.00	8.00
Scorpion .....	.15	.15	.15	.15
Syndicate .....	.15	.15	.15	.15
Tioga .....	.15	.15	.15	.15
Union Con. ....	.25	.35	.40	.45
Utah .....	.95	1.05	.90	.95
Yellow Jacket .....	.95	1.05	.90	.95

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Feb. 11.	100 Mexican.....	30c	
450 B. & Belcher.....	1.25	100 Mono.....	3.65
204 Bodie Con.....	1.30	100 Navajo.....	35c
200 Bullion.....	30c	200 Ophir.....	25c
100 Chollar.....	85c	650 Peerless.....	25c
200 Con. Pacific.....	15c	200 Savage.....	1.15
420 Con Va & Cal. 2.40c	2.45	100 Sierra Nevada.....	70c
100 Confidence.....	.90c	100 Scorpion.....	.05c
150 Eureka Con.....	1.25	100 Union Con.....	.50c
500 Gould & Curry.....	.80c	100 Utah.....	.60c
300 Hale & Nor.....	2.20c	110 Yellow Jacket.....	1.00

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Feb. 11, 1886.	
ANTIMONY—Per pound.	12 @
Hallet's	12 @
Cookson's	13 @
BORAX—Refined	5 @
IRON—Glenora	23 @
Eglinton, ton	22 @
American Soft, ton	24 @
Oregon Pig, ton	22 @
Clippers Cap. No. 1 & 4	24 @
Clay Lane White	24 @
Shotts, No. 1	24 @
STEEL—English, lb.	16 @
Black Diamond, ordinary sizes	13 @
Flow	8 @
Machinery	8 @
Sanders Bros.	13 @
COPPER—	
Brass sizes	20 @
Fire-brass sheets	20 @
Rolt	20 @
Yellow Metal	12 @
Ingots	12 @
LEAD—Pig	4 @
Bar	4 @
Pipe	7 @
Sheet	8 @
Shot, discount 10% on 500 bag	1.85 @
Buck, # bag	2.05 @
Chilled do	2.25 @
ZINC—German	9 @
Sheet, 7x3 ft. to 10 ft. less the cask	71c @
QUICKSILVER—By the flask	33 @
Flasks, new	1.05 @
Flasks, old	85 @
TINPLATE—Coke	5.15 @
Charcoal	6.15 @
NEW YORK PRICES—	
California BORAX	36 @
Pig Iron, American	43 @
Quicksilver	20 @
Australian Tin	20 @
Bar—live	1.01 @
Lead	11 @
Copper	11 @
Refined Silver (per cent discount)	20 @

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OFFICE OF THE Caledonia Gold Mining Company San Francisco, California.

At a meeting of the Board of Directors of the above-named Company, held February 8, 1886, Dividend No. 4, of Ten Cents (10¢) per share, was declared, payable on Tuesday, the 23rd day of February, 1886, at the office of the Company, and at Messrs. Laidlaw & Co., Transfer Agents, 14 Wall street, New York. Transfer books will close on Saturday, February 20, 1886, at 12 o'clock M.

W. LETTIS OLIVER, Sec'y.
OFFICE—No. 328 Montgomery St., San Francisco, Cal.

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 262 Market St., S. F.

FOR WEEK ENDING JANUARY 26, 1886.

- 334,736.—WASH BOILER—G. Bergenheim, South Butte, Cal.
334,934.—BELLOWS—Geo. T. Campbell, S. F.
335,015.—SWIMMING APPARATUS—W. J. Corbett, Tucson, A. T.
334,762.—MOWING MACHINE—Benton Elmore, Shasta, Cal.
334,766.—R. R. CAR SIGNAL—Sands Forman, Gold Hill, Nev.
334,859.—BARK CUTTER—J. C. Hagerty, Santa Cruz, Cal.
335,029.—BUTTON HOLE MACHINE—T. F. Hagerty, S. F.
335,076.—FRUIT BAG HOLDER—I. H. Kizer, Riverside, Cal.
334,991.—CART—Ilans Shagen, East Portland, Or.
335,003.—CAR AXLE—Wilhelm & Demmer, Portland, Or.
334,833.—TRAVELING THRASHER—N. S. Wilson, West Butte, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

RAILWAY CAR SIGNAL.—Sands Forman, Gold Hill, Nev. This is a means by which the engineer can be signalled from any car on a train, and is also a means by which he is notified if the train breaks in two parts. It consists of a pair of pipes extending from the end of the train and connected with suitable couplings, one of these pipes being connected with an air compressor, while the other is connected with a whistle or other signaling device near the engineer. A means of communication is formed between these pipes in each car with an operating lever or device so that the compressed air from one pipe may be admitted into the other and directed forward so as to give a signal. These devices are also each connected by a rope with the front of the succeeding car, so that if the train accidentally breaks in two the rope will operate the valve and give a signal.

TRAVELING THRASHER.—Newton S. Wilson, South Butte, Colusa county, No. 334,833 dated January 26, 18

DELINQUENT NOTICE.

Pine Tree Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Summit Mining District, Kern County, California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 24th day of December, 1885, the several amounts set opposite the names of the respective shareholders, as follows:

NAME.	No. Certificate.	Shares.	Amount.
Bennet, C.	9	1,000	\$ 150.00
Griswald, A. H.	10	1,000	150.00
Griswald, A. H.	13	1,000	150.00
Griswald, A. H.	14	1,000	150.00
Griswald, A. H.	16	500	75.00
Griswald, A. H.	05	500	75.00
Griswald, A. H.	08	250	37.50
Griswald, A. H.	07	250	37.50
Griswald, Mrs. A. H.	8	1,000	150.00
Griswald, Wm.	17	500	75.00
Griswald, M.	18	500	75.00
Griswald, Harriet B.	19	500	75.00
Wilson, W. C.	7	20,000	3,000.00
Wilson, W. C.	20	1,000	150.00
Wilson, W. C.	21	1,000	150.00
Wilson, W. C.	22	1,000	150.00
Wilson, W. C.	23	1,000	150.00
Wilson, W. C.	24	1,000	150.00
Wilson, W. C.	25	1,000	150.00
Wilson, W. C.	26	1,000	150.00
Wilson, W. C.	28	500	75.00
Wilson, W. C.	29	500	75.00
Wilson, W. C.	30	500	75.00
Wilson, W. C.	31	100	15.00
Wilson, W. C.	32	100	15.00
Wilson, W. C.	33	100	15.00
Wilson, W. C.	34	100	15.00
Wilson, W. C.	35	100	15.00
Wilson, W. C.	36	100	15.00
Wilson, W. C.	37	100	15.00
Wilson, W. C.	38	100	15.00
Wilson, W. C.	39	100	15.00
Wilson, W. C.	40	100	15.00

And in accordance with law, and an order of the Board of Directors, made on the 22nd day of December, 1885, so many shares of each parcel of stock as may be necessary will be sold at public auction, at the office of the Company, room 4, No. 309 California street, San Francisco, California, on Monday, the 15th day of February, 1886, at the hour of 2 p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. M. RUFFINGTON, Sec'y.

OFFICE: Room 4, No. 309 California St., San Francisco, California.

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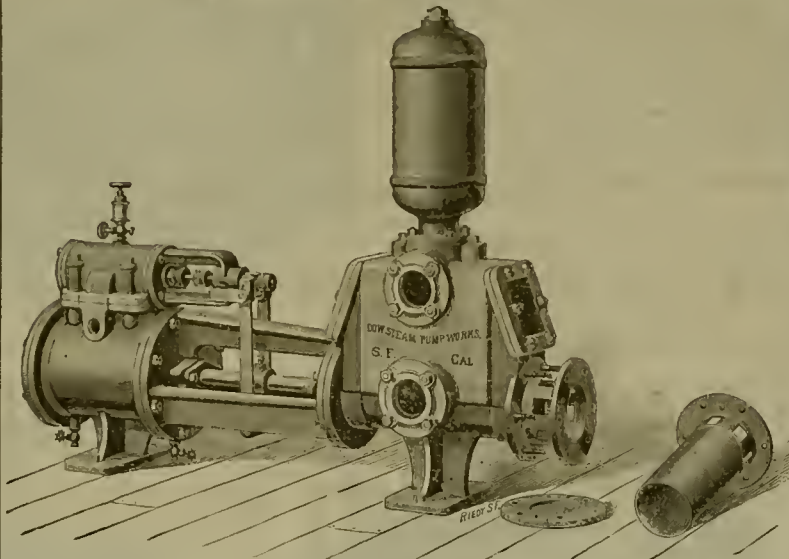
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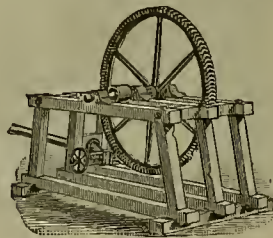
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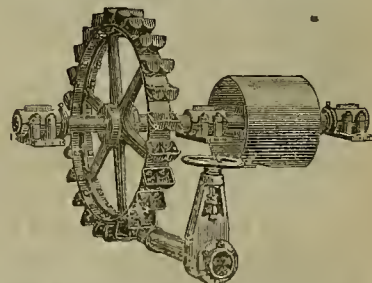
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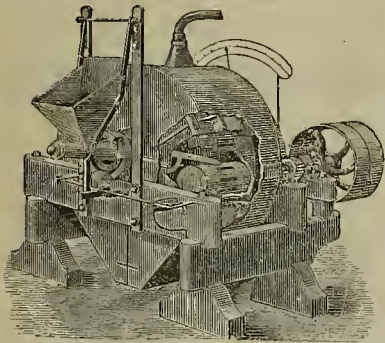
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[From the Engineering & Mining Journal, Aug. 8, 1885.]
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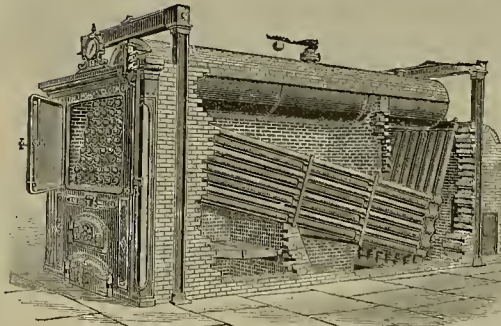
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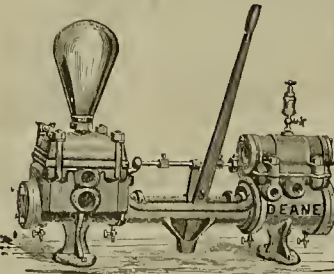
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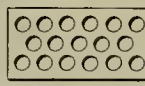
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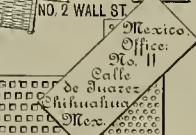
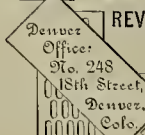
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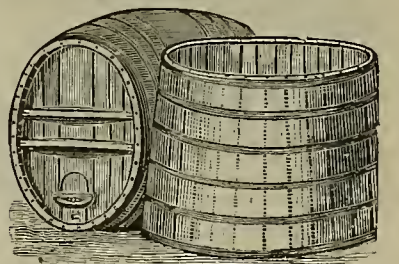
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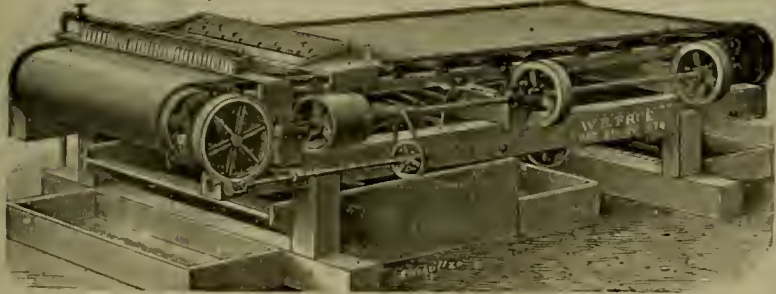


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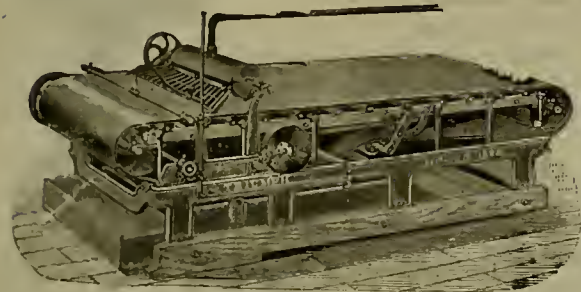
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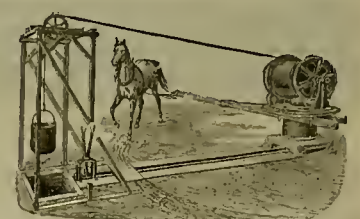
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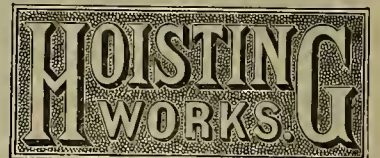
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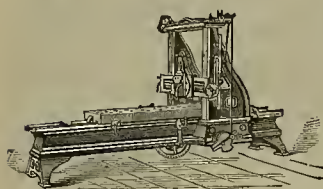
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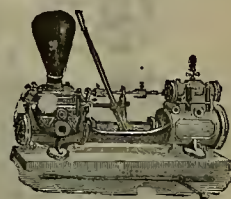
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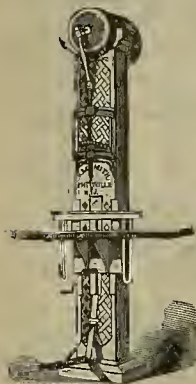
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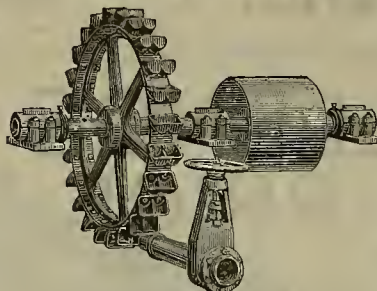
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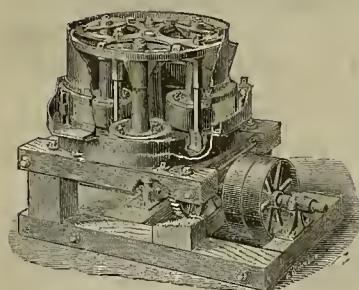
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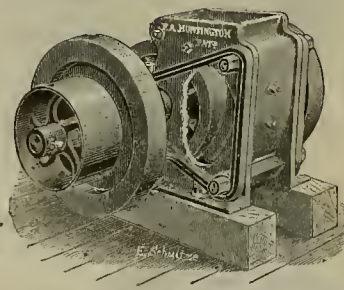
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An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, FEBRUARY 20, 1886.

VOLUME LII
Number 8.

Mine Timbering.

When an ore body is encountered in driving a drift, it is usual to place the first sill across the drift, laying the ties parallel to the drift. This is done to retain as wide a space as possible for the passage of the car, the sills being longer than the ties. In carrying up the timbering the timber which forms the cap of a lower set becomes the sill of the set above it. The same is the case with the ties. In beginning a slope the sills often consist of a long piece of timber in which the posts are mortised at their usual distance apart. As each set is raised the caps are covered with two-inch plank, and in this way floors are constructed. The spaces between the floors and timbers are filled with waste, and thus a compact mass is formed from one side of the ore chamber to the other and from the bottom to the top, which takes the place of the ore removed, and which is capable of sustaining the enormous pressure exerted by the surrounding rock. The timbers are wedged and braced against the limestone walls of the chambers, so that the whole stands solid. It is customary to fill in with waste, as opportunity offers, the absence of that peculiar "crawling" ground so common on the Comstock obviating the necessity for immediate filling. Sometimes the flooring is removed before the spaces between the timbers are filled.

Fig. 1 represents the posts, caps, and ties as framed in the Richmond mine at Eureka, Nev. The tenon of the post is 9 by 6 by 1½ inches; that of the tie, 9½ by 6 by 1½ inches. The tenon proper of the cap is 9 by 7½ by 3 inches, but there are several shoulders on the cap made to fit the spaces left between the post and tie. The dimensions of all these different parts can be seen in Fig. 1 and the manner in which they come together was shown in the article on this subject given last week.

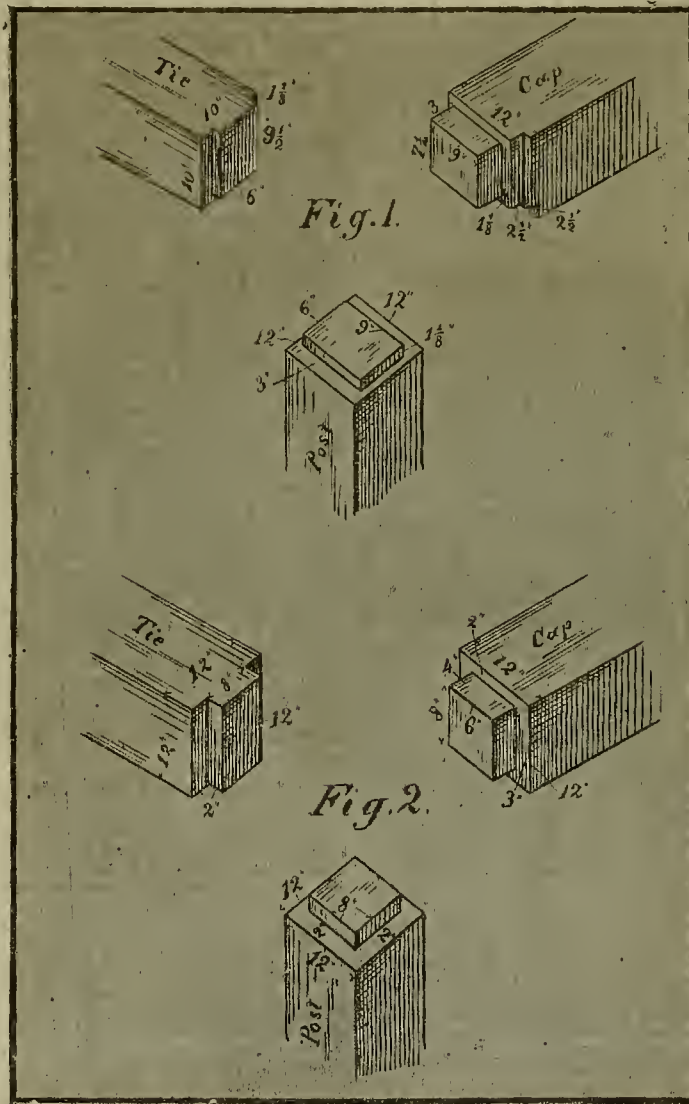
This method of framing is complicated, and therefore expensive, but it is claimed that it gives great strength to the joint. Upon an examination of Fig. 1 it will be observed that the tenons of the posts, and also some of the shoulders of the caps, are cut somewhat short of what would be their proper length if they were framed to meet exactly. This is to allow the timbers to come together easily, as any irregularities in the joints caused either by imperfect cutting or subsequent warping would interfere with their proper fitting were not some space allowed. This is the more necessary on account of the complicated system of joining. Pressure soon causes any imperfect parts to meet.

Fig. 2 represents the timbers as they are framed at the Eureka mine. The tenon of the post is 8 by 8 by 2 inches, that of the cap 6 by 8 by 4 inches, and that of the tie 12 by 8 by 2 inches. The tenons of all these are also cut somewhat scant, but as there are not so many shoulders as in the Richmond timbers they do not need as much play and are easily fitted together. Timber men usually prefer the Eureka to the Richmond method, contending that the timbers are equally strong and more easily framed. The Eureka timbers seem best calculated to resist pressure from all sides, while those of the Richmond offer the greatest resistance parallel with the caps. This would be what was required in timbering an ore body the greatest dimensions of which was along the course of the lode, as is the case with Comstock

bonanzas. In this case the ties would be placed parallel to the walls and the caps at right angles. In Eureka, however, the ore bodies are very irregular and the pressure is usually about the same from all sides. On the first discovery of an ore chamber, too, it is impossible to determine with any certainty what may be its ultimate course, and consequently how the

12, though occasionally they are but 10 by 12 inches. Sets of timbers 10 by 10 inches are sometimes used when the ground will permit of it and the ore bodies are small, but 12 by 12 inches for the posts and caps at least is the rule.

The timbers are cut into the required lengths by circular saws, and framed by hand. Split



METHODS OF FRAMING MINE TIMBERS.

timbers should be placed. It is, therefore, well to have a system of timbering which will be equally effective in all directions. When all the pressure comes from above, which, however, is rarely the case, it would be well to have the ends of the posts rest directly on each other, not allowing the tenon of the caps to intervene.

The usual length of the posts is 6 feet between shoulders; that of the caps and ties 5 and 4 feet respectively. The timber used is pine from the Sierra Nevada. It is hewn 12 by 12, 10 by 12, or 10 by 10 inches square, and is of excellent material. The ties used in the Richmond are 10 by 10 or 10 by 12 inches, as the case may require. In the Eureka they are usually 12 by

lagging and sometimes poles are used in the drifts and small ore bodies where the heaviest timber and planking are not required.

D. H. THOMPSON, an experienced prospector, has discovered a gold-bearing lead near the Elko line, about 30 miles from Willow Creek, Nevada. The ledge, which has been named the Omega, is about fifteen inches wide near the surface, and rich in free gold. The lead is situated in an unprospected range, where there is no mining district.

THE business portion of the town of Flagstaff, Arizona, has been destroyed by fire.

Retorting Amalgam.

The size of the ordinary retort in use is 12 inches in diameter and four feet in length inside. It will hold from 600 to 1000 pounds, according to the quality of amalgam and whether the vent is in the center or upper edge of the end. It is usual now to cast retorts with the vent at the upper edge of the end, and if two vents are made opposite each other in the end the retort can be turned over. This kind of retort is fast superseding the old style, when the vent was in the center of the end. Retorts up to 20 inches in diameter are in use. Retorts are sometimes turned either a half or a quarter revolution after a "helly" has formed on the bottom, but generally they do not last long after turning, and the practice is open to strong objections. The retorts are generally circular in section. Amalgam is not often charged in cups, but is frequently divided by disks of iron in order to save the trouble of breaking up the bullion for the melting pot. The retorting of a charge takes from five to nine hours, according to its size and character. From one-sixth to one-half a cord of wood is consumed per 1000 pounds of amalgam retorted.

The charge is heated slowly to the boiling point of quicksilver, and maintained at that temperature until most of the quicksilver has been expelled, when it is gradually heated to a light cherry red for an hour or so, to expel the remainder. A mixture of salt and ashes is used to swab out the retort and for luting on the head. When the retorting is properly done the loss of quicksilver by distillation is merely nominal. Where the vent is in the upper edge, or the amalgam is not hase, or the pipe is kept open by a rod, the vent does not choke. With dirty or hase amalgam, there is always danger that the vent may choke if it is in the center of the end of the retort.

An ordinary retort will stand from 100 to 300 changes if properly handled, but as practiced, the life of retorts is usually much shorter. Steel retorts have been tried, but it was found they washed too much. The fact that steel turns out sooner than cast-iron would be a sufficient objection to its use. In some small gold mills, where the amount of bullion produced is not large, simple hulk retorts of cast-iron are used in place of the cylindrical ones.

The hulk retorts require no brick fitting and can be used over an assay furnace or a blacksmith's forge, and are convenient for operations on a small scale.

THE new enterprise to supply water-power for the Empire and other mines in the district, says the Grass Valley Union, is now under way, work having been commenced on a ditch leading from the large reservoir of the South Yuba Company to the site of the receiving reservoir of the new company. The work is to be pushed with all possible speed.

PLACER diggings have been struck at Corral canyon, eight miles east of Lewis, in Lander county. The Battle Mountain Nevada says the hedrock dirt pays from \$2 to \$3 per day with a rocker.

A MOVEMENT is on foot in Nevada county to extend some of their big mining ditches to the lower foothill country, where the water can be applied more generally for irrigating purposes.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Virginia City, Nevada.—No. 3.

The Pumping Machinery, Water and Heat in the Lower Levels of the Comstock.

[From Our Special Correspondent.]

Through the courtesy of Mr. A. C. Hamilton, superintendent of the Chollar and Potosi, and Mr. R. Keating, superintendent of the Savage and Norcross mines, and the head carpenter, Mr. W. H. Pratt, the best opportunities and facilities were afforded your correspondent for reviewing the extensive works above ground, as well as exploring the mysterious realms below, and securing a complete inspection of the ponderous and gigantic mechanism planted in the bowels of the earth, at 2400 and 3000-foot levels. At the helm of this whole plant, as principal foreman, we found an old and time-honored reader of the MINING AND SCIENTIFIC PRESS, in the person of Mr. Chas. Matheson. He has been connected with these mines for more than 20 years, and a constant reader of the PRESS for more than 10 years. Like many other principal operators, owners and officers along this Comstock lode, he could not think of doing without the MINING AND SCIENTIFIC PRESS. We hardly need say that in him we found a most thoroughly interested and obliging helper, taking all pains and trouble to point out and explain the interior workings, bearings, modifications, etc., of this

Comprehensive and Most Stupendous Plant.

A plant which he so minutely understands and so easily and skillfully manages. He furnished us a gentleman who presides as foreman of the pump works, Mr. D. Donahue, as our guide in making the detour among the lower levels. We counted ourself fortunate in having secured an escort of such high intelligence, as well as of such rare experience in engineering skill, to conduct us through the vast depths of this underground world. Mr. Donahue stated that he had but recently returned from an European visit, and in his extensive review of mines and mining interests there had met with nothing that seemed to excel or even equal what could be found on the Norcross, Savage & Chollar, in amplitude, perfection and power of machinery. We confess to have received full credit for his assertion when we came to witness the workings of the two

Hydraulic Pump Engines

Planted on the 2,400, 2,600 and 3,000 foot levels, employed to raise the in-rushing waters, the one 800 and the other 1,000 and another 1,900 feet above, to be emptied into the great drain canal running along 1,600 feet below the surface, to wit, the Suto tunnel. Great chambers scooped out of the primitive rock on these two lower levels, somewhat resembling capacious Masonic halls, are the receptacles into which are introduced these ponderous engines to be operated by hydraulic pressure, obtained from the vertical pressure of a column of water about 3,400 feet in altitude. When we witness the expansive effect of water let into the most powerful air-tight wine cask by a pipe only 30 feet high, we can form some faint idea of the multiplied forces and geometrical ratio with which power is brought to bear upon these engines.

When we held up our lamp and observed that the dynameter placed against the granite wall indicated 1,500 pounds to the square inch within these cylinders, we could hardly help exclaiming on the utility of steam rendering any material aid to such machinery appointed to do such work as this. The hydraulic agency exerted through this principle, is the only factor that could here be made available for moving such massive machinery, assigned to perform such herculean tasks. Our attention was specially invited by the engineer to observe the proportional size, strength and quality of the various parts of these huge, underground mechanical leviathans, and to notice how well all the splendid workmanship was designed and adapted to receiving this enormous pressure. When we had fully interviewed these two pumping engines planted at the two levels spoken of, we made a final descent to 3,100 foot level. After a smart walk of several hundred feet, we found ourselves in the Norcross mine. Here, at the termination of a drift, we found quite a group of miners sinking an incline on the main lode, at an angle of about 45°. This incline already extends some fifty or sixty feet, and is presenting a character of ore of no ordinary grade. The specimens which we obtained from this winze are the fairest and apparently the richest of all the beautiful samples that we have yet obtained from the Comstock lode. The lode here is of great width, and all the prospectings are similar to those which have heretofore marked near approaches to other large bodies of ore found scattered along the Comstock lode.

The Cornish Pump.

In ascending to the surface we took a narrow cage that runs up and down beside the long piston-rod that works to the Cornish pump. In explanation, it may be said that there are four compartments in the main shaft, of some six feet each, and the moving piston-rod or pump-bob occupies a part of one of these subordinate shafts. This piston-rod is 2918 feet long,

(to an inch) and 14x14 inches square, composed of iron and wood, well plated, riveted, bolted, lapped, and jointed together. This model piston-rod, of the Cornish pump, is rather an elephant of its kind, and, as we were looking down the dark shaft one day, when it was moving lazily up and down (on the principle, we presume, that great, or long bodies move slowly), we felt inclined to doubt the answer given us as to its real length. Our doubts were wholly removed, as we came up out of the 3100 foot level, having traced it all the way up, and finding it just 2918 feet long. This rod is so long that, had we not fortunately enjoyed the privilege of measuring it, (with our eye) from bottom to top, we should scarcely have dared to commit the matter to the public print, as it might have appeared somewhat incredible, or "snakish" to some of our readers. And now, whoever thinks it rather long can take the trouble to measure it for himself, as your correspondent did. This rod of the Cornish pump is attached to the end of a gigantic walking beam, and is employed on its downward pressure in a forcing pump to raise water from the lower levels to the height of the Suto tunnel (1600 feet below surface), where it is constantly pouring forth its flood of hot water into boxing, that conducts it into that before-named great water-way under the mountain. The Cornish pump removes 650,000 gallons of water per day. But it stands no comparison to the hydraulic pumps that are constantly at work on the 2400, 2600, and 3000 foot levels, as they combined removed, the day before we were at the mine, 3,486,576 gallons in 24 hours and that is considered but an average day's work.

So there goes forth from this one shaft on the Comstock lode, all told, not less than 4,000,000 gallons of hot water every day, with a reserve capacity, Mr. Matheson says, of 1,000,000 more, if so required.

By building up solid granite bulkheads in some of the lower drifts, there has been given a sensible check to a share of this inconvenient element, and where unusual quantities of water are tapped, this ingenious and successful improvement will be kept up, thus affording the mines greater facilities for future operations.

The Great Heat in Deep Mines.

The presence of great heat in these lower levels is owing to the large quantities of hot water entering the mine, and, according to Prof. Backer's theory, may spring or arise from chemical action, or from the ascent of this fluid from volcanic depths below. In either case the suppression or expulsion of it effectually abates the heat and cools off the mine. We noticed in some passages and drifts that the temperature appeared only about as warm as we have experienced it for weeks together in the open air about Tombstone, Arizona, and for similar periods of time in the great grain districts of the Sacramento valley, California. Therefore, no serious inconvenience was met with from this cause, during our trip of about two hours below on these lower levels. The miners, whilst but slightly clad and perspiring freely, are yet enabled, by taking brief respites, at regular intervals, in the cold air chambers constructed for that special purpose, and, filled with cool, fresh air, forced from above to pass through with no great difficulty their allotted shifts of eight hours.

Most manifestly, in principal points of physique, they display the finest and most athletic forms to be found in the various walks of industry anywhere. In fact here, as well as in the C. & C. mine, and generally throughout this camp, every possible convenience and comfort has been provided to render the position of the workmen both safe and agreeable. The officers, too, we have noticed, while generally quiet, careful and thorough, are observed to be courteous, kind and sociable, even among their own workmen, thus establishing a footing at once, both pleasant and satisfactory. We, in common with many others, more deeply interested, look forward to a time—and that not far hence—when the outlay of this combination effort, will begin to unfold its glittering treasures to those who have toiled so faithfully and so long to draw them from these vast depths. Since the first lines of this article were written the news comes to us from Leadville camp that new and most surprising bonanzas have been struck in several parts of that district, and that even on Fryer hill, by deep mining, and contrary to the opinion of the writer in the Mint Director's report, quoted in our last letter respecting these mines and the Iron Silver, they have gone down 30 feet on ore running \$1800 per ton, and the bottom has not yet been reached. The correspondent who has written such glowing accounts of the great resurrection of all the mining interests in Leadville, of January 23d, in the "Financial and Mining Record," New York, says: "The results of deep mining which I urged two years ago are producing their effects." As we gathered up the glowing lines descriptive of that productive industry, we thought down deep in the depths of our heart, When will the responsive echo go back to the bonanza on the top of the Rockies from her toiling twin sister by the Nevadas in triumphant trumpet tones, "Gentlemen, we needed no urging—gone down to the 3200 level and struck the highest and richest bonanza America ever saw." And, from the remarkable specimens of ore that lie before us, and other indications derived from the depth of 3160 feet below the surface, we believe that such a responsive echo will be forthcoming in less than one year from this date.

J. D. P.

Utah Mines.

Silver Reef District.

EDITORS PRESS:—Presuming you have gleaned sufficient of facts and figures from Utah papers relating to this camp, I will only endeavor to add what I think may be of interest to those who have not been here of late.

The property of the Stormont Company is being worked by about the same number of men as have been employed for the past two years, and is producing about the same quantity of ore, namely, about 40 tons per day. The quality of the ore has deteriorated somewhat in the time above mentioned. Notwithstanding this, and the fact that the workings are more wet, more troublesome and more complicated, this property, with continued efficient management, is likely to keep on in the even tenor of its way for many years to come.

The Christy mines are easily producing all the fair-grade ore the mill can crush, and the mill seems to easily get away with the 40 tons per day that the mines produce. These mines have never looked better than at the present time.

The Barber property is now idle.

What now promises to be one of the leading enterprises of the camp, is the new leaching works of Harding & Co., which occupy the place of the machinery of the old Leeds mill. This company has been operating, in a small way, for a year past, but principally on well oxidized tailings. With the new and extensive plant, Cornish rolls, 15 immense tanks, elevators, etc., and capacity for 80 tons per day, a grand success ought to be the result. We can only regret that this company did not purchase the mines as well as the mill, etc., and thereby have one of their own to fall back upon.

The old Leeds mines, which made so many dividends and created so much speculation in the past, are still a source of product to chloriders and to its single owner, in the way of royalty. All chloriders are restricted to a two or three months' lease, and often debarred from hiring help. This seems to work a hardship on those who would like to lay out more extensive work. However, many of the lesses are doing well. Hartman & Pearce, on the termination of their lease, shipped 45 tons and have taken a new lease. Kimple & Lewis have some 60 tons first-class, and over 300 tons of second-class. Other parties have less amounts, but some good ore.

The ores of the Leeds mines average as high as do those of the Stormont Company, and no water to contend with in the deepest workings. The company had all the appliances for producing ore and bullion and, by a comparison between the Leeds and the deep, wet workings of the Stormont mine, we clearly see wherein management has so much to do with the life or death of our mining towns.

At the Butte mine work is going on and a nice grade of ore is coming out. Water has heretofore precluded the development of this mine; but now they have steam-power and pumps, and satisfactory results are anticipated.

Some mines owned by small parties, and by whom they are worked, have shipped considerable ore to the river mill in the past few months. Among them are the Vanderbilt, Lamb & Steel, and Duffin, all situated on the east reef.

I don't think a brighter prospective future has ever presented itself to this camp. Business houses of all kinds have no reason to complain. More visitors and transient people are here this winter than has been for the two preceding years.

Tellurides and Fine Gold.

EDITORS PRESS:—Last December I called attention to the high fineness of the gold in quartz in two mines in this (Tuolumne) county, and near the town of Sonora, viz., the San Giuseppe and the Neale mines, and I stated that I believed the gold from the former to be higher in fineness than that from any other quartz mine in California or any other country. I also asked if gold of such extreme fineness was known to exist in any other locality that the fact he stated through your columns. This article of mine in the PRESS has called forth several notices, among others one concerning the gold in the Lawrence mine, Yavapai Co., Arizona, and in your issue of Feb. 6th, you give a list of quartz and placer mines, 20 of the former and 31 of the latter, showing the fineness of the gold in each. The quartz mines in this list representing the greatest fineness are the Table Mountain and Bald Mountain mines, in this county—they giving each gold of 950 fineness, equal to \$19.64 per ounce. Of the placer mines, not quartz, the highest is that from Spanish Hill, El Dorado Co., viz., 987, equal to \$20.48 per ounce.

Now for the comparison. The last bar of gold from the San Giuseppe quartz mine showed a fineness of 985½, equal to \$20.47. Thus it will be seen that the quartz gold of the San Giuseppe mine is considerably higher in fineness than that from any other quartz mine, and equal, within one cent per ounce, to that of the highest placer mine. The San Giuseppe, therefore, stands to the front of all quartz mines yet heard from in this particular, and it may be added that the fineness of its gold is increasing, the last bar being the finest yet produced, and it may yet reach 1000, equal to \$20.6718—chemically pure gold.

I also notice in your issue of the 6th of this

month that you speak of the discovery in this county of petzite, one of the forms of telluride of gold of great richness, and that the miners, not knowing what it was nor its value, and calling it "white stuff," had been throwing it away. This is true, and I beg leave to say that an article written by myself for the Independent newspaper of this town (Sonora) about two months ago, and copied in the PRESS, attracted the attention at once of the miners here to its true character and great value. It came about in this way: Mr. John Neale, of this town had some exceedingly rich rock coming from his mine, and on inspection of it, at his request, I was struck with its appearance, and after extracting the free gold by amalgamation, I subjected the residue or tailings to various tests and determined its character and announced the fact. I am gratified to say that the discovery has been of great practical value, for the ore formerly thrown aside as worthless is now being most carefully saved for reduction, its extreme value reaching as high as \$60,000 per ton, justifying any, even the most expensive mode of reduction. Mr. Garrett, who owns a mine in the vicinity of the Neale mine, is also availing himself of the discovery and saving the tellurides heretofore regarded as of no value by him.

Two days ago, on trying some ores from Calaveras county I detected telluride of gold—exceedingly rich—from a mine now being developed and not known to contain such ores.

Sonora, Tuolumne Co. LOUIS BLANDING.

Butte, Montana.

[From our Travelling Correspondent, R. G. HUSTON.]

(Continued from our last.)

The different secret Orders are well represented here. Masons have two Blue Lodges, one Chapter, one Commandery. Odd Fellows have two Subordinates, two Eocompments, one Degree Lodge. Knights of Pythias, three Lodges and one Endowment Rank. Ancient Order of United Workmen, Knights of Honor and many others are represented. The Miners' Union is the strongest organization of the town, and seems to be determined to keep their wages at the present rates, and I am truly in sympathy with them, for a man earns all he can get for this kind of work. Although they sometimes may work a hardship on a man having a low-grade ore to work, they will not permit him to employ men at rates that he can afford to pay, but as long as the matter is not brought to an issue there will be no trouble. The union numbers about 1500 in Butte, and own their own building and pay \$10 per week sick benefits, and is decidedly one of the strong influences of the camp.

Substantial Improvements

Have been decidedly the order of the day for the past year or two, as there are many large and well-built, comfortable, home-like, brick houses. From statistics obtained through the kindness of the *Inter-Mountain* and *Miner* publishers, I find that about \$900,000 worth of improvements have gone up here in the past year. It gives a town an air of solidity that it can acquire in no other way to have large business blocks built and also comfortable houses.

It is a bonanza for landlords here, I tell you. I heard of one instance of a man taking agreements and bonds from tenants to pay a stipulated amount for rent for five years, and thus rented his whole building before he put it up or did anything to it. The building cost him \$35,000, and he is receiving \$18,000 per annum, and his contracts run for five years. Pretty safe investment I think, and profitable, too. Rents in good business points are high here—as high as on Market street in San Francisco.

All the different churches have houses of worship here, and from appearance are in a fairly prosperous condition.

There are three hospitals in the city for the taking care of and the treatment of sick. The Alice Mining Company at Walkerville runs a hospital for their men on the same principle the railroad company run one for their men. Each man contributes a small spend from his pay each month; a good thing, for miners are a very improvident set of fellows, and this keeps them in case of accident.

The town has also a district telegraph system and messengers, and also a well-managed day and night telephone service connecting them with the principal points within 100 miles of Butte.

In the line of amusements they have a finely appointed opera house and all of the celebrities passing through stop and give them a few performances. Any theatrical troupe that goes or comes by the Northern Pacific is sure to stop at Butte.

All the different lines of merchandise are well represented here, and by live men who are alert to take advantage of any point in trade at short notice.

Trades of all kinds have their points of business, and each his portion of the trade. There are nearly 500 business firms in the town, to say nothing about doctors, lawyers, contractors, and many others who transact their business through offices.

There are very few failures in business here, which is about the best recommendation I can give any man to go by and to judge of the facilities for doing business here.

The press is ably represented by the *Butte Miner*, daily and weekly, the *Inter-Mountain*, daily and weekly, and the *Town Talk*, daily, and all are doing well.

MECHANICAL PROGRESS.

Working and Tempering Steel.

To work steel never heat above a light cherry red for hammering, says the *Iron Trade Review*, then hammer light and quick until nearly black, as this improves the steel and will make tools that will do more than double the work than if not so treated. The hardness of steel is governed entirely by the heat when it is dipped in water; for instance, a piece of steel dipped at a bright cherry color and drawn to a straw, will be very much harder than a piece heated to a dark cherry red and then dipped and drawn to a straw. Try it.

The forging, hardening and tempering of steel is an art that but few understand, as its knowledge is only gained by experience, and but few ever give its secrets to others; yet in a few words I will try to give the principal elements to workers of steel, which if followed will save you many losses, and give you a reputation for working steel that will insure you good and serviceable tools, as well as increase your gains.

Please remember that the heat at which steel is worked and hardened are two of the vital elements to produce good and serviceable tools. If heated above a light cherry red some of the vitality of the steel is destroyed, and it would in heating too many times return to iron. If heated too hot when hardening, it would fly to pieces, destroying your labor and steel as well as giving you a poor reputation.

Remember also to hammer your work lightly at a low heat, as this improves chisels, drills, lathe tools and edge tools most wonderfully, also take as few heats as possible, as overheating and too frequent heating reduces the steel to iron by destroying the carbon.

To harden taps, rimmers, chisels and drills, always dip them slowly to the depth desired in as near vertical lines as you can by the eye and hand, then move in a circular position until cold, but never any deeper in the water than first dipped, as this prevents them from cracking, which they would be likely to do if held perfectly still and the water formed a line around them. Do not change the water in which you temper, but as it wastes fill up the tank. If you are obliged to use fresh water always heat a piece of iron to put into it and bring it to such a warmth as is perceptible to the hand, as steel is liable to crack when dipped into cold water. When you have heated your article to be tempered take it from the fire and examine to see if any flaws are observable in the steel, as this will prevent your having poor pieces of steel laid to your carelessness in hardening.

In cutting up steel a thin sharp chisel should be used, as a blunt one is liable to splinter or crack the bar, which will not be seen until it is tempered and then the labor is lost with the steel.

Colors of different articles for use.—Taps should be hardened and then brightened by rubbing emery and oil on the clearance, and then draw on a hot plate or in a heated ring to a dark straw color.

Drills for iron should be a dark straw on the cutting part and the rest a blue.

Chisels for iron should be violet color; for cutting stone a purple is required.

Milling cutters should be of a yellowish white. Gear teeth cutters the same color. The usual way to dip these is to have a rod with three prongs to pass through the hole after it is heated to dip with, lower slowly until all the cutter is under the water about two inches, then move in a circular position until thoroughly cold, remembering that a great many things break by taking from the water before they are cold, especially large pieces of steel, as the center retains the heat, and when taken from the water it expands the outside and causes it to crack.

In tempering pieces have a thick and thin edge, always dip the thickest part first. Study the pieces you have to harden and it will help you very much. Large centers in work for tempering should be avoided, as they are liable to cause the end to split open.

The Economy of Compound Engines.

The primary object of compounding, says the *Age of Steel*, is, of course, to secure a higher degree of fuel economy than is possible with any single cylinder engine. This possibility is founded on the fact of the severe internal condensation which takes place on the inner surfaces of the cylinder and piston. This condensation in turn is due to the wide and rapid fluctuation of temperature between the limits of the temperature of the admitted steam and temperature of the exhaust. This statement bas in it a flavor of the theoretical, but in reality there is no phenomenon of steam engineering more practical, and, unfortunately, more unavoidable. Engineers understand this, and users pay for it whether they understand it or not.

With the single cylinder engine there are two methods of boding this loss partially in check—high rotative speed and moderate super-heat. The former is always taken advantage of as far as constructive considerations will allow, and notably in the Reynolds-Corliss engine. The latter is difficult of attainment, and unless carefully controlled is liable to be destructive of

the packing and lubrication of the engine. Compounding acts by dividing the expansion between two or more cylinders, whereby the fluctuation of the temperature on the surface of each cylinder is largely reduced.

Reduced to a practical result, a compound engine well proportioned to its load and pressure, may be expected to develop a horse power on 13 to 11 pounds water per hour, against 18 to 20 pounds from a single cylinder condensing engine. A fair boiler evaporation is 9 pounds water per pound coal, hence something like 1.2 pound coal per horse power per hour, may be expected from judicious compounding. Applied to 400 horse power with coal worth \$4.00 per ton, this means a net saving of \$1,200 per annum—a large interest, truly, on the increase of cost of the engine. Disregarding theory, the results are attested by the fact that in service where cost of fuel is the controlling consideration, as on steamships, in water works, merchant flour mills, etc., compounding is imperative. In Europe, and England particularly, compounding is a rule in manufacturing.

This paper from which we have quoted as above, gives an illustration of what it terms "a tandem compressed engine," in which the two cylinders are placed end ways to each other. The steam is first admitted to the high-pressure cylinder where it is expanded down to within 4 to 6 pounds of the atmosphere; it is then released into the receiver; from the receiver it passes to the low-pressure cylinder, where it is expanded a second time to about 9 pounds below the atmosphere, when it is released to pass to the condenser, thus forming nearly a continuous line of expansion from the boiler pressure down to 9 pounds below the atmosphere, and to this high ratio of expansion is due the increased economy in the use of steam and fuel. This engine is worked with a Corliss cut-off.

Testing Boiler Plates.

We are glad that the engineers of the Manchester Steam Users' Association have introduced severe tests for boiler plates. The pulling or extension tests are applied, we understand, by means of a testing machine, and the strain is increased until the plate is torn asunder. Elongation, as well as the greatest tensile strain, is noted. The bending test is, if possible, more rigorous. Strips are taken of from six inches to nine inches in length, and an inch in width. They are heated to a low cherry red, and then plunged in water of about 80 degrees Fahr. When cold the strips are bent double, the rule being that every one must hinge on a curve, having a radius of not more than one and a half times the thickness of a strip, and it is expected that the bending will be accomplished without any sign of failure being visible. It has been found that steel boiler plates as now made are, as a rule, much more ductile than iron plates. Strips cut from iron boilers have, on being tested, in some cases behaved most unsatisfactorily. They fractured on bending at the slightest departure from the straight line, and on being pulled asunder broke short off without any elongation, showing that they were of a very brittle character and unfit for use in a boiler. Short brittle plates are apt to give rise to dangerous cracks, which lurk at the rivet holes and lie concealed under the overlap, till, in course of time, a rip suddenly occurs and gives rise to an explosion. In view of the serious number and terrible character of boiler explosions, we certainly think that too much can hardly be done in this direction.—*Building World*.

GOING BACK TO FIRST PRINCIPLES.—One of the displays at the Novelties Exhibition, at Philadelphia, bore the startling title of "Doors Hung Without Hinges." Close inspection of the model showed that in places of hinges pivots were employed at both the top and bottom of the door, and located in the architrave. The object of this construction is to avoid the mutilation of doors and the finish about doorways and the unsightliness of hinges. This construction also avoids an aperture between the edge of the door and the jamb when open. Another advantage to which the inventor directs attention is that this construction avoids the friction of from two to ten or more points to each door, as is the case with the ordinary hinges in common use. He further directs attention to the fact that doors which are liable to sag when hung with hinges in the usual manner are, by the use of the pivot, fastened to the architrave, which rests on the floor in such a way as to avoid sagging. For self-closing doors there is used in connection with the pivot a concealed spring, doing away with the ill-looking contrivances sometimes used for the same purpose, and which mar the beauty of well finished doors.

The writer has long had two doors hung in this manner at his residence on Folsom street, in this city, and finds them very convenient. This is simply going back to the first principles and adapting the same kind of hinges which were in general use by the Ancient Greeks and Romans.

CONVERTERS.—According to a return lately issued, there are now 23 steel works in England, having among them 115 converters; Austria and Hungary have 12 steel works, with 34 converters; Belgium 3 steel works, with 18 converters; France 7 steel works, with 34 converters; Germany 23 steel works, with 80 converters, and Russia 5 steel works, with 10 converters.

SCIENTIFIC PROGRESS.

Electricity and Gaslight.

The question is often asked, Can large gas burners successfully compete with the arc electric light? Whether that is so or not, it is quite sure that the people are deriving an important indirect benefit from the efforts which the electricians are making to supersede gas. This benefit is alluded to in the *Gaslight Journal* as follows: The introduction of electric lighting has beyond doubt created a demand for illumination on a greater scale than had previously been deemed necessary. In order to satisfy such demand with gas, without too greatly increasing the ratio of consumption, the employment or adoption of high candle power burners became necessary; and since their introduction we are assured that a much greater lighting efficiency is obtained from a specified quantity of gas than was deemed possible only a few years ago. These burners now being available, the demand for increased illumination can be supplied without a proportionate increase in the consumption of gas—a result which is surely acceptable to the consumer, as well as gratifying to the producer.

To successfully compete with the electric light, it is obviously necessary to employ the same amount of energy, and possess ourselves of a measure of assurance like unto that displayed by our electrical brethren. It is only just to them to say—when we see in almost every city the marks of their progress—they have been pushing and energetic; and we do them no injustice when accusing them of the possession of a large amount of that great American commodity—"cheek." Certainly we need no better justification for making the latter accusation than by pointing to their extraordinary claim of 2000 candle power for their arc lights, and calling attention to their bewildering statements as to cost of producing the same. If the claimed cost of production increases, in practice, in the same proportion as their asserted candle power has diminished when examined through the lenses of actual tests, there is likely to be a collision between claims and facts—with serious results to the former.

Oxygen in Water.

Faraday proved that a gas or vapor is nothing but a liquid at a temperature above its boiling-point, and he liquefied nearly every known gas. It is only within the last six years that the five or six gases which had previously resisted liquefaction have been reduced to that state by perfected modern appliances for producing cold and pressure. At the present time a chemist in Paris is making liquid oxygen by the pound. When gases are dissolved in water, they somehow assume the liquid state therein, and increase the bulk of the water. The harmonic pressure has a feeble influence in causing variation in the amount of oxygen absorbed by water, the variation not exceeding a small fraction of the grain per gallon; yet in a large river that means a variation in the quantity of oxygen to be measured by tons. River water in summer contains about four grains of oxygen per cubic foot, and about five grains in winter. In August, 1859, Dr. Miller ascertained the proportion of oxygen in the Thames at low water, and found that, as it runs through London, the quantity of oxygen in it diminishes as compared with the proportion it contains at Richmond. About 12 or 13 tons of oxygen are lost between Richmond bridge and Somerset house.

Other chemists have since taken up the work, and their results agree quite closely. Tests of the Thames water show that near the London sewage outfall, it contains but about half a cubic inch of oxygen per gallon, instead of two cubic inches per gallon as above the city; but lower down the proportion of oxygen rises again, until the water is within 10 per cent of its richness in oxygen at Richmond. Thus the considerable power which flowing water possesses of keeping itself sweet and clean is no longer a matter of speculation, but one of positive proof. Still the power, great as it is, may be overtaxed, and often is overtaxed in some cases, when the organic matter is non-living. As to whether it has the power of destroying those minute living organisms which are the germs of certain diseases, there are at present very great differences of opinion among chemists.

THE LICK OBSERVATORY.—The successful casting of both portions of the object glass for the great Lick telescope, and its rapid approach to a finish in the hands of Mr. Clark at Cambridge is drawing much attention to the important observatory on Mount Hamilton, in this State, where the telescope is to be mounted. It may be interesting in this connection to refer to the object and conditions of this princely gift which will approach to near \$1,000,000 of outlay. So far as Mr. Lick's intentions are concerned they may be inferred from the language of the trust deed, which provides that as soon as the telescope and observatory are completed the trustees shall convey the same, together with all the machinery and apparatus connected therewith and the ground upon which the observatory is built, to the regents of the State University, and that the telescope and observatory are to be known as the "Lick Astronomical Department of the University of California."

This seems to imply an intention that the observatory and its appurtenances should be as much an appliance of the University as the apparatus belonging to the department of natural philosophy or chemistry, or any other department; and that the extent or restriction of its use was a matter to be entirely within the control of the Board of Regents. The fact that Mr. Lick provided for and directed the construction of a telescope superior to and more powerful than any ever yet made had a meaning. It is evident that he did not contemplate that a telescope of that description should be used merely for instructing a class of pupils in astronomy. The uppermost thought in his mind was, without doubt, celestial exploration and discovery in the general promotion of astronomical science. This is certainly a most reasonable inference.

Extinction of American Animals.

Mr. Ernest Ingersoll, in a paper just published by the American Geographical Society, makes a startling record of the extinction of wild animals from this continent by the settlement of the country. Much of this lamentable decrease of animal life was unavoidable. But Mr. Ingersoll does well to descend upon the ruthless waste of one of our most valuable resources. Only twenty-five years ago the great plains were covered with buffaloes, and Mr. Ingersoll says: "I myself have seen steamboats halted on the upper Missouri by swimming bands of these finest of wild cattle." But the extension of the Pacific railways has been made the occasion of a needless extermination of them. The elk, moose and deer have suffered a similar fate, until now it is said that the elk, which eight years ago were seen in thousands on the plains of the Sweetwater and in the Wind River mountains, have practically been driven to their last refuge in the Southern Rocky Mountain plateau.

Mr. Ingersoll shows that this baleful disturbance in the natural order of animal life is not limited to the land alone. Seals, which once disported in the Atlantic surf along this coast southward to Cape May, have retired to the Newfoundland or Labrador coast. The habitat of the oyster on our Atlantic coast has seriously decreased. The feathered tribes, especially the prairie chicken, the wild turkey, ducks and all game birds, have been sadly depleted, and still the slaughter goes on almost unchecked.

Mr. Ingersoll suggests that an arrest might be put upon this uncalled for destruction by making and enforcing "a law which should permit so-called sport to be indulged in only by a selected few who had proved their capacity for common sense and self-restraint."

The Wonders of the Sea.

The sea occupies three-fifths of the surface of the earth. At the depth of about 3500 feet waves are not felt. The temperature is the same, varying only a trifle from the ice of the pole to the burning sun of the equator. A mile down the water has a pressure of over a ton to the square inch. If a box six feet deep were filled with sea water and allowed to evaporate under the sun, there would be two inches of salt left on the bottom. In the many bays on the coast of Norway the water often freezes at the bottom before it does above.

Waves are very deceptive. To look at them in a storm, one would think the water traveled. The water stays in the same place, but the motion goes on. Sometimes in storms these waves are 40 feet high, and travel 50 miles an hour, more than twice as fast as the swiftest steamer. The distances from valley to valley, between the waves, is generally 15 times the height; hence, a wave five feet high will extend over 75 feet of water. The force of the sea dashing on Bell Rock is said to be 17 tons for each square yard. Evaporation is a wonderful power in drawing the water from the sea. Every year a layer of the entire sea, 14 feet is taken up into the clouds. The winds bear their burden into the land, and the water comes down in rain upon the fields, to flow back at last through rivers. The depth of the sea presents an interesting problem. If the Atlantic were lowered 6564 feet, the distance from shore to shore would be half as great, or 1500 miles. If lowered a little more than three miles, say 19,680 feet, there would be a road of dry land from Newfoundland to Ireland. This is the plain on which the great Atlantic cables were laid. The Mediterranean is comparatively shallow. A drying up of 660 feet would leave three different seas, and Africa would be joined with Italy. The British channel is more like a pond, which accounts for its choppy waves.

THE PINE LUMBER SUPPLY.—How long will this wonderful work among the pines continue? The stock of pine yet standing in Michigan can produce 40,000,000,000 feet of lumber if cut for the purpose. In eight years, therefore, at the last average production of the State, the pine will have been used up. But such predictions have been made for years past. In 1867, the standing pine of Michigan was estimated to be 52,416,000,000 feet, and it was predicted that it would be all gone in seventeen years. But since then the Saginaw valley alone has produced about 12,000,000,000 feet, and will continue to cut in the neighborhood of 1,000,000,000 feet a year for eight or ten years to come. As pine grows scarcer, it will make more lumber than when it was plenty.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

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Passing Events.

The silver question is attracting great attention just now and the anti-silver men seem to have gained a temporary advantage by the very unexpected report of the coinage committee, voting against free coinage.

Very rich gold quartz has been brought into El Paso from the old placers of Guadalupe, Alameda county, State of Chihuahua, Mexico. The placers have now become a husy mining camp, and Americans as well as Mexicans are flocking thither in search of gold. The great scarcity of water in the locality makes this commodity command a fabulous price. A number of the residents of the State of Oaxaca were the first to uncover the new fields. The city of Chihuahua is much excited over the find.

Very severe cold weather in Alaska has caused the shutting down of the big gold mill at Douglass Island.

With the lengthening of the days the prospectors will begin to start work again in the mountains. Most of the gold-bearing regions of this coast will be pretty well searched over this spring and summer, gold mines being in demand.

THE El Callao quartz mine, Venezuela, of which H. O. Perkins, of Nevada county, is superintendent, gave a yield for November of \$211,453, from which a dividend of \$77,280 was declared.

THE United States Circuit Court has decided the suit of Vincent Elbert against D. Jones, in favor of the defendant. The suit involved the ownership of the Mono Lake hydraulic mine.

Coarse Grinding of Gold Quartz.

Mr. J. A. Johnson, of this city, has recently been making some experiments with gold-bearing quartz, the results of which are of interest. He had several batches tested by milling process though this saved only 41 per cent, from ore that assayed \$25.11 per ton. This was crushed wet, passed through a 40-wire screen, and amalgamated in the ordinary way. This result was, of course, very unsatisfactory, as about 60 per cent of the value passed away into the tailings.

Tests of the ore were then made on the Stiles grinding mill. The ore was crushed fine enough only to pass through a 20-mesh. As Mr. Johnson terms it, the quartz was "just cracked," and the little pieces of gold freed so as to fall out without being ground up. We examined this pulp under a glass, and the little pieces of gold appeared just as they evidently were in the matrix. There was no sign of attrition upon them. The result, whatever the reason, was a very great improvement over what the stamps and fine crushing had done. He finds he takes over 60 per cent of the gold out in this first coarse grinding, and then the second grade is run through again. Mr. Johnson says he can, with one machine, crush 10 tons a day with two-horse power.

The mill which ground the quartz is one invented by Wm. C. Stiles, and this is its first real practical trial on auriferous quartz. Mr. Johnson, after the tests, bought the mill and will order others. In this mill there are conical corrugated disks mounted on parallel shafts, two cones being placed back to back upon one shaft and revolving between two other conical disks mounted on the other shaft, so as to revolve close to the faces of the double cone.

The frame has hoxes on the side for the shaft, upon which are fixed disks having conical faces, the apexes of which converge toward the shaft. Upon these conical-faced disks are fixed sections, the inner faces of which are ridged or corrugated to form grinding surfaces.

The other shaft has also disks with corrugated sections similar to those described, but on these the apexes of the conical faces diverge from each other as they extend toward their shaft and their bases are close together. The disks are sufficiently separated to allow the double cone upon the other shaft to fit between them. The angles of the conical faces being the same, it will be manifest that those upon the latter described disks will fit between those upon the other disks, the contiguous faces running parallel with each other.

In order to prevent the ridges on the grinding surfaces from coming into contact with each other, if the cones should be adjusted so as to touch, narrow flanges are formed around the exterior and interior edges of the grinding sections, and a little higher than the corrugations, so that these flanges will touch and prevent the corrugations from rubbing against each other.

The grinding sections are preferably formed of steel, and are so secured by bolts that they are removable and changeable. The hoxee in which one of the shafts turns have lugs which pass down through slots in the frame and through holes in rods or bars beneath, to which they are secured. These bars or rods extend horizontally beneath the frame and through holes in its end, by which they are guided and held in place. Strong springs act upon the ends of the bars, which project beyond the ends of the frame, and thus draw them with the hoxes and the double cone toward the cones between which it travels. If any hard, unyielding substance should pass between the cones, the springs would allow them to separate until it passed.

Material is fed into a hopper and discharged from it between the contiguous surfaces of the cones and is discharged, as ground, below. A pulley communicates motion to one shaft and its cones, while the other cone is driven by the friction created by the passing material, or by direct gearing, if desired.

THE Bald Mountain Extension drift mine, Sierra county, in its cleanup for January, beat the well-known Young America mine, of Sierra City, by about \$3000. After paying current expenses for the month, and a dividend of \$6000, there remained a surplus of \$5000. This was from only four weeks' cleanups, one of which was 417 ounces.

Roasting Silver Ores.

Silver ores which require roasting before they can be amalgamated are of very varied composition. There are some ores which contain so little sulphur that only an incomplete chlorination is obtained unless sulphur, either in the form of blimstone, or iron pyrites, or of copras, is added before the ore is introduced into the furnace, sulphur in some form being necessary for the decomposition of the salt and the liberation of the chlorine. There are other ores, on the contrary, which contain so much sulphur in the form of sulphides that a long oxidizing roasting is necessary before they can be prepared for chlorination. The typical roasting ore is quartz containing silver minerals and from ten to 15 per cent of iron pyrites, with a slight admixture of copper sulphides. Calc spar, fluor-spar and haun-spar, if present in any quantity in an ore, retard the chlorination, as they absorb a large part of the sulphuric acid. Arsenic and antimony minerals increase the loss of silver by volatilization. Zinc blende requires a long oxidizing roasting to convert it into sulphate, and then a high temperature must be maintained before it will decompose the salt. Where there is a large amount of zinc in the ore the chlorination is an imperfect one. Lead and copper contaminate the amalgam and hullion. All these minerals involve the use of a large percentage of salt in roasting, but if present in only small quantities they do not perceptibly effect the chlorination.

In mixing ores the sulphur and silver contents of the charge are kept at those percentages which have been determined in actual practice to be the most favorable under the circumstances to the chlorination of the silver. The effort made to obtain rational rules as to the most expedient relation of silver sulphide, salt, etc., was a failure, according to the report of the various officials, most of the managers having determined their mixtures empirically and knowing nothing definitely of the percentage composition of these ores. The richer and baser the ore the more salt it requires.

Stamp Out the Frauds.

Let every honest minded citizen speak out and make infamously odious the lottery frauds that are sapping the life out of legitimate business enterprise in this State, destroying the business and social morality of people all over our land. Look with righteous contempt on all who have anything to do with this corrupting business and moral leprosy that is now stalking through the land and claiming its victims among the high and low, rich and poor, young and old. Having lately found a rich customer in California, the managers of Southern lotteries are now making special efforts to reap a rich harvest of California "gulls." They have distributed a few prizes where they are calculated to have the greatest effect, and are now, through ingeniously constructed advertisements, published as reading notices in our first-class dailies, seeking to agitate and excite the populace to patronize these dastardly swindles.

The prizes advertised as drawn by Californians, it is safe to say, will not all amount to one-fifth of the hundreds of thousands of dollars Californians have within the last 18 months sent out of the State to perpetuate these stupendous frauds.

THE VALENTINE MINE CASE.—Judge Hunt has decided the case of A. T. Britton vs. Walter C. Childs, A. Lacey and wife, intervenors, in favor of the defendant upon all the issues. The case has been on trial for over two weeks, and was to recover \$40,000, alleged to be due the plaintiff on a contract between Lacey and Childs, whereby the latter agreed to purchase the Valentine mine, in Calaveras county, for \$50,000, of which sum \$40,000 was to be paid Lacey out of the future profits of the mine. The plaintiffs and intervenors claimed that work was improperly conducted in the mine, and was stopped too soon, and upon these issues a great amount of testimony, including the opinions of mining and milling experts, was introduced.

A LETTER from Salmon Falls, Cassia county, Idaho, says there is no truth in the rumors that men are making from \$5 to \$20 in rockers. Only those who are working on a large scale are making anything.

Washington's Birthday.

In the hurry and rush of life in this country where the communities are scattered over such a vast area, the people are apt to give little thought to the origin of many of the blessings with which they are favored in a free government. Only twice a year are they reminded of the early struggles to gain this freedom—on Fourth of July and on Washington's Birthday. On Monday next the latter anniversary occurs. Aside from the mere honoring of the memory of the "Father of his Country," which it is but just that we should do, the day is one which should cause us all to give consideration to the life and character of Washington. Pure patriotism, unflinching integrity, devotion to a noble cause, energy in overcoming obstacles, and skill in both the legislative halls and in the field, gained for him the applause of the world and the love of his countrymen.

The young of the present generation can have no nobler example of patriotism held up to them. Parents can find no purer character in history to tell their children of than this, and it should be impressed upon their minds that love of country, truth, integrity and an upright life are sure to bring their reward. On an anniversary of this kind, these and kindred facts should be commented on and considered by both old and young. We are too apt to think of the day as a mere holiday for recreation without considering sufficiently the great man, whose birthday we celebrate, and the result of whose labors we enjoy. There is latent patriotism in all men, but it is not always properly developed. These anniversaries should serve this purpose, and we should all congratulate ourselves on our good fortune in living in a nation at peace with all, and with sufficient strength and dignity to maintain its position. The early builders of the republic, who sacrificed so much for those who came after them, deserve to be gratefully enshrined in our memories. And chief among them, as the leader of our armies, and the first president of our nation, stands the figure of George Washington. The anniversary of the day when he first saw light—over 150 years ago—should always be reverentially kept by the generations who enjoy the fruits of his prowess in the field, his patriotism and his statesmanship.

Mining Accidents.

HARRY Johns, working on the 1700 level of the Crown Point mine, on the Comstock, was very seriously injured one morning last week. He was working in the breast on the second floor above the level, putting in a cap timber, when a mass of rock fell, smashing the plank upon which he was standing, precipitating him to the floor below. Both collar bones were broken, and he sustained severe strains and contusions about the hips and back, besides being otherwise severely cut and bruised about the head, shoulders and breast. It was a wonder that he was not killed outright. Con Sullivan and Joe Dettmar, two miners employed in the McNally mine, Fine Gold district, Fresno county, have been seriously injured by the ore car, which was being hauled up the incline, becoming detached and running back and crushing them.

Wm. Bree has a quartz ledge on his ranch, on the lower Colfax road, Nevada county, and when agricultural duties are not pressing upon Mr. Bree, he occupies his time in developing his quartz claim. One day last week, while Mr. Bree was at work in the mine, a mass of rock and earth fell, catching him under it and badly bruising him. The worst hurt received was about the head, as his scalp was badly cut in several places. His shoulder and neck were also bruised considerably.

AT AURORA.—As near as the present mining proposition at Aurora can be understood, the Bodie Miner says it is intended to give the mines a fair test through the Del Monte mill, and in the course of a few months, if this fair test will justify it, they will commence the work of mining on an extensive scale.

THE reason of the purchase some time ago of the Silver City, Deming and Pacific Railroad by the Atchison, Topeka and Santa Fe Company, is showing itself in the well founded rumors that the latter intends to build from Silver City to Bisbee, Tombstone, and other points in Arizona at an early date.

The State Hotel in the Yosemite.

Most readers are aware, no doubt, of the fact that the last Legislature appropriated \$40,000 to be expended by the Yosemite Valley Commissioners in the construction of a hotel for the better accommodation of the tourists who come from all parts of the world to be the guests of the State on her grand property, the Yosemite valley. It would not do to allow private capital to build a structure upon ground belonging to the State and thus obtain a monopoly of entertainment, so the desirability of a State structure, which should be under control of the Commission, became apparent. The Commission acts in the capacity of superintendent for the owner. It determines who may lease lands, and what rents shall be charged, lay out and operate trails and roads and run for a fee lines of wagons and coaches, and maintain pack and saddle-trains. It owns the houses used as hotels, leases and determines the charges to be made this public for services and entertainment, and this because under any other system the valley would be made the scene of contention among wrangling competitors for patronage, and the public would thus suffer annoyance, extortion and imposition.

The last Legislature appropriated the sum of \$40,000 for the erection of a proper hotel building in the valley. But no exclusive privileges can be granted for hotel-keeping in the valley. The Commission may grant others the privilege of entertaining and by requiring the lessee of the new hotel to properly entertain, it will insure like catering by all other hotels that it may permit to be established. The hotel is to be leased, so as to annually produce not less than three per cent upon the cost thereof.

The Commission obtained plans from a number of architects and bids from a number of contractors and finally adopted the plan shown in the engraving designed by E. L. Chandler, of Los Angeles, and let the contract for building to Carle, Croly and Abernethy of Sacramento. We are indebted to the *Record Union* of that city for the use of the engraving which we present herewith.

The hotel is of Swiss style of architecture, and, as will be seen, is appropriate to its montane surroundings. It will be named the "Stoneman House" as a compliment to the Governor, who is president of the commission. The specifications disclose the fact that it is to be first-class in every part of its construction and fitting, the timbers being very heavy, of the best material, and the fittings of the best order known; the object being to secure great durability in a climate that not infrequently is very severe. The front structure, from wall to wall, and exclusive of the porches, will be 100 feet in length, with a depth of 56 feet. The side shown in our illustration, in perspective, is an L, or wing, running back 68½ feet, by a width of 34 feet, thus giving a front of 100 feet by a depth of 124½ feet. Upon the left of the front is a parlor 23x29½ feet, with folding doors, 11x10, opening into a breakfast-room back of it, 23x24½; folding doors from this, 10x10, open into a dining-room, along the rear wall, 20x36. Next to the parlor, and opening into it by folding doors, 7½x10, is a reception room, 15x19. Back of this rise the stairways in two tiers, 5½ feet in width. Next to the reception-room, in the center of the building, and having the main entrances, is the gentlemen's parlor, 28½x32, out of which rise the stairways and open doors into the dining-room. Opening into this parlor at the rear is the office, 8x10½, and back of it the clerk's room, 10½x12. To the right of the office is the manager's room, 14½x20. Out of this parlor, on the right, at the rear, is a hall leading to the harrier shop at the extreme right, 8x10, to the rear of which, by a short hall, is the lavatory and closets, 12½x14. To the right of this parlor are four bedrooms opening into a short hall, the two first being 11.3x12 and 11.3x13.6 respectively. The

other two are of the same width, but are 14 and 15.6 respectively in depth. The balconies around this trunk of the building are 10 feet in width, but in front of the gentleman's parlor are 16 feet in width.

This wing, at its juncture with the main building, opens into the breakfast room by a six-foot passage, out of which rise the rear stairways. On the front side of the passage is the storeroom, 11.3x13.6. On the other side is the pantry, 10.9x15. The passage referred to between the pantry and storeroom extends to the cross wall beyond the kitchen, which is 23x33, to the rear of which is the laundry, 17x23.6, and a broad hall opening into the rear yard. Back of the hall is the servants' dining room, 12x16, and a flight of stairs.

The second floor is reached by the front stairways opening into a large hall running lengthwise of the building, and crossed by two other halls extending the entire width, and one of which extends entirely through the length of this wing. On the left of this floor are five rooms from 13.2x17.6 to 10x17.6 in size. In front are four rooms 11.3x15 each. Back of them two interior rooms, 11.3x13 constituting suits with two of the front rooms. To the rear are three rooms 9.1x13.6, and one 13.6x13.9. On the extreme right are five rooms 10.7x17.6 each. In the wing next the main structure is a lavatory 9x10, with closets, to the rear of which are three bath-rooms 5x10 each. Back of these

W. Chapman, Madera; Wm. B. May, San Francisco; Governor George Stoneman, Sacramento. The officers of the Board are: President, Governor George Stoneman; vice-president, I. W. Raymond; secretary and treasurer, Wm. B. May; executive committee, I. W. Raymond, chairman; Thomas P. Madden, Wm. B. May.

An Improved Pumping Plant.

The San Francisco Tool Company has for some little time been making a specialty of pumping outfits for irrigation and reclamation enterprises, and have been very successful. Engines and pumps are made in compact form and adapted for any special work. The engines used for this purpose are single acting and are made in such a form that the working parts are enclosed. For information on the merits of the San Francisco Tool Company's pumping plant, the company refers to the Mayor and Council of Sacramento. Also to J. C. Pierson, Esq., County-Surveyor Sacramento, and Pierson Reclamation district; the Rough and Ready Island, Reclamation Company district 403. Geo. C. Smith, Esq., Stockton, Messrs. Rock & Fox, San Jose, who irrigate some 300 to 400 acres of nursery grounds at Niles, Alameda county, by lifting water 57 feet with one of these remarkable pumping plants. Also to P. J. Van Lohen Sels, Esq., of California street and Walnut

Utilizing the Tule.

In the swamp lands on this coast, and along the shores and islands of the Sacramento and San Joaquin rivers, there are immense tracts covered with the tule or tule grass. This is a large club rush or sedge of the order *Cyperaceae*, and known scientifically as *Scirpus validus*. In this State it grows to a great height and its stems attain considerable diameter. These stems are very pithy, and when dried become very light and buoyant. They are not of such a loose texture as to become water-soaked, and will remain on the surface of the water for an indefinite time. The economy of this material recommends it for such purposes as life-preservers, and its abundance and extreme lightness make it preferable to cork. Mr. Constant Leduc several years ago patented the idea of forming life-preservers from snitahly-arranged bunches of this dried tule. There is no external covering of canvas or other material, such as is usually employed. The same inventor also devised a machine for making tule bunches for life-preservers.

In December, 1884, a company was incorporated here to make life-preservers out of the California tule, Charles J. Hendry being president, and manufactories have been established in this city, in Sacramento and at Stockton. The device was approved by the secretary of the treasury in February, 1884, and it was adopted by the Supervising Inspectors of Steam Vessels. Last year 5000 life-preservers, made of California tules, were sold in Boston, in addition to the large number used on the Pacific Coast. At the recent meeting of the Supervising Inspectors, a life-raft made of tules was adopted. It is expected that this will largely increase the sale of California tules, as, manufactured into life-saving apparatus, according to Mr. Bemis, 6 pounds of cork will buoy up 24 pounds' weight, while 3½ pounds of tules will buoy up from 36 to 40 pounds. Tules exist in almost unlimited quantities in California.

Another form in which the tule has been utilized is in making protecting coverings for the glass on the patent box-demijohns used on this coast. It is elastic, tough

and strong, and will last an indefinite time.

Of late, insoles of shoes have been made of the flattened stems. These are formed to fit the shoe inside, and come between the foot and the shoe, keeping the foot from any dampness in the leather sole and adding to the warmth as well. A carpet lining is also made of tule, the rushes being woven together to form a sort of soft matting, which is placed under carpets.

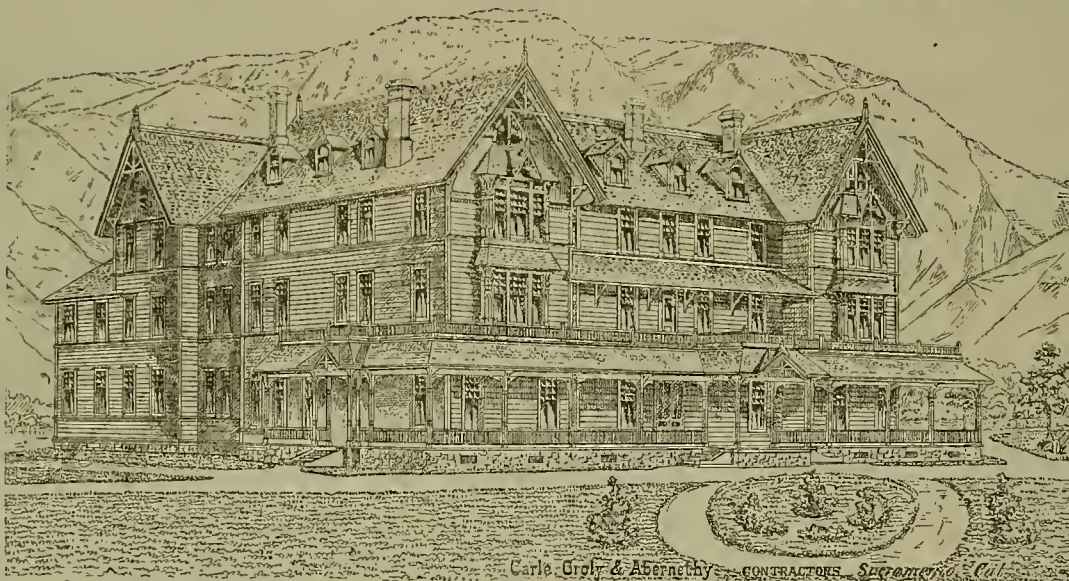
List of U. S. Patents for Pacific Coast Inventors.

FOR WEEK ENDING FEBRUARY 9, 1886.

- 335,737.—DIVIDED CAR AXLE—Geo. W. Redbury, S. F.
- 335,738.—MITER BOX—W. L. Boeyer, S. F.
- 335,745.—VARIABLE CRANK AND ECCENTRIC—W. H. De Valin, San Rafael, Cal.
- 335,751.—VALVE FOR WINE CASKS—Thomas S. Glaister, Sonoma, Cal.
- 335,754.—FRUIT JAR FASTENING—Geo. V. Hendrie, S. F.
- 335,756.—STAVE JOINTER—A. M. Jewell, S. F.
- 335,762.—EMBROIDERY FRAME—John Levinson, S. F.
- 335,769.—TRACK CLEARER FOR MOWERS—Paterson & Himebach, Tiptown, Cal.
- 335,774.—LABEL DRYING MACHINE—C. Rahskopff, S. F.
- 335,773.—APPARATUS FOR COOLING WHITE LEAD—D. Ravkes, S. F.
- 335,637.—VOLTAGE BELT—A. T. Sherwood, S. F.
- 335,638.—ELECTRIC BELT AND TRUSS—A. T. Sherwood, S. F.
- 335,639.—ELECTRIC TRUSS PAD—A. T. Sherwood, S. F.
- 335,727.—SHEET METAL PIPE MACHINE—F. F. Voigt, Walla Walla, W. T.

See list of patents for week ending Feb. 2, 1886, on page 131 of this issue.

A bid has been made by the Union Iron Works for the construction of a new steamer for the Oceanic Steamship Company's Australian line.



STONEMAN HOUSE, TO BE ERECTED BY THE STATE IN YOSEMITE VALLEY.

are four rooms, two of them 10x11½ and two 9x10. Along the front wall of the wing are rooms, one 13½x13½, two 11½x11½, one 9x13, and a linen closet 5½x12. At the rear are two rooms 8½x10, all with numerous closets.

The third floor, over the main building, is a repetition of the second, and also in the wing is a repetition of the second to its extent, it being two rooms shorter, 21½ feet, as will be seen by the illustration. The attic is laid off in four rooms upon the left side, one 13x20, and three 11½x13; along the front four rooms, 12½x13½; back of them a closet and two rooms, 12½x13½, and one 13½x16. Along the right wall are four rooms, one 13x20, two 9.9x13, and one 13x14. The attic is pierced by a central hall and two cross halls at either end. The building contains 92 rooms, exclusive of closets, lavatories, etc., as follows: Main floor, 19; second floor, 31; third floor, 27; attic, 15. The height of the different stories are: First, 14.2; second, 12.2; third, 11.2; attic, 7 feet on the sides and 10.3 in the center.

Our architectural view sufficiently discloses the exterior finish, the window schemes, the roof, balcony, hoods, etc. The structure will be placed beneath the overhanging majesty of Glacier Point. The reader must not take the mountains shown in the engraving as typical of the Yosemite heights. They are merely the conventional hills which the architect chose for a background for his perspective view of the building.

The present Commission which will superintend this new enterprise for the improvement of the valley, is composed as follows: I. W. Raymond, San Francisco; W. H. Mills, San Francisco; J. H. O'Brien, Stockton; Thomas P. Madden, San Francisco; J. M. Griffith, Los Angeles; Jonathan Mentzer, Coulterville; E.

Grove. At Walnut Grove Mr. Van Lohen Sels has two 15 inch pumps coupled together, driven by a 60-horse power engine, with a combined capacity of 20,000 gallons a minute.

The San Francisco Tool Company has now under contract and is constructing for Mr. Van Lohen Sels a 30-inch pump, connected direct with a compound condensing engine of 150 horse-power, which will lift 40,000 gallons of water a minute, or the two plants 60,000 gallons, or 86,400,000 gallons in 24 hours. In other words, given a rainfall of four-sevenths of an inch over an area of 20 square miles, the Van Lohen Sels pumping plant could, by 24 hours' continuous pumping, remove it all. The 150 horse-power engine will be run by a battery of three boilers; two 60-inch by 16 feet, and one 48-inch by 16 feet. These boilers will be so connected that any one or two of the whole can be used as required.

The *Central Nevada* says the reported sale of the Pittsburgh mines at Lewis to Haggin & Tevis, San Francisco, for \$90,000 is a mistake. On the contrary, the property has been withdrawn from the market until the pending litigation can be settled by the courts.

The Liberty Hall Consolidated Mine and Water Company has petitioned the Circuit Court to suspend the temporary injunctions, on the ground that the slickens are being impounded.

Owing to the recent troubles at Seattle, the coal mines of the Oregon Improvement Company have been shut down, and as a result, the three colliers of the company will remain idle for a time.

MANY miners from New Mexico and Arizona are on their way to the Honduras gold fields.

PRACTICAL HYDRAULICS.*

NUMBER 18. COPYRIGHTED.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

CURVED BENDS.

Let h = additional head required to overcome the resistances of curvature.

b = angle of curvature of the pipe.

R = radius of curvature of the bend.

r = radius of the pipe.

z = coefficient of resistance.

$$h = \frac{z b^2 v^2}{180^\circ} = \frac{z b v^2}{n(2g)} \quad (177)$$

$$z = 0.131 + 1.847 \left\{ \frac{r}{R} \right\}^2 \quad (178)$$

Eq. (178), from which Table 20 is computed, is for pipes with circular cross sections.

TABLE 20.

Coefficients of Resistance of Curvature with Circular Transverse Sections.

$\frac{r}{R}$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
z.....	.131	.138	.158	.206	.294	.440	.661	.977	1.408	1.978

Rule 41.—The additional head required to overcome the resistance of curvature, of a bent pipe, is equal to

the product of the head, $h = \left\{ \frac{v^2}{2g} \right\}$, generating the ve-

locity, the ratio $\left\{ \frac{b^\circ}{180^\circ} = \frac{b}{n} \right\}$ of 180° or n , to the an-

gle of deflection or length of bend, and the coefficient of resistance, corresponding to the ratio of the radius of curvature to the radius of the pipe.

Ex. 83.—The velocity of water in a pipe 2 inches diameter, is 16 feet per second; what additional head will be requisite to overcome the resistances of a bend in the pipe, whose radius of curvature is 2 inches, and angle of deflection 90° ?

Cal.—Head generating velocity, equal to the square of the velocity, divided by 64.4 , as $h_f = 16 \times 16 \div 64.4 = 3.975$.

$\frac{r}{R} = \frac{1}{2} = .5$, ratio of given radii; $b = \frac{90^\circ}{180^\circ} = \frac{1}{2}$, ratio of 180° , to given angle of deflection.

By Table 20, the coefficient corresponding to .5, the ratio of radii is .294.

Then by Rule 41, $3.975 \times \frac{1}{2} \times .294 = .584$ feet.—Ans.

$$z_u = 0.124 + 3.104 \left\{ \frac{r}{R} \right\}^2 \quad (179)$$

In Eq. (179), from which Table 21 is computed, r represents half the width of a rectangular pipe; and R , the radius of curvature of the axis.

TABLE 21.

Coefficients of Resistance of Curvature in Pipes with Rectangular Transverse Sections.

$\frac{r}{R}$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
z_u	1.124	.135	.180	.250	.398	.643	1.015	1.546	2.271	3.228

Remark.—Rule 41 applies to finding the additional head required to overcome the resistance of curvature of a bent pipe, whose cross section is rectangular, by employing Table 21 instead of Table 20.

Total Head.—Let in general:

$$h_u = n z_u \left\{ \frac{v^2}{2g} \right\} \quad (180)$$

represent the additional head requisite to overcome the resistances of n , given bends—angular or curved—in a pipe, the form of whose cross section is given—circular or rectangular.

Combining (180) and (122), observing that $c = .505$ of (127), $\frac{p}{a} = \frac{1}{r} = \frac{4}{d}$, and $2g = 64.4$,

$$h + h_u = \left\{ 1.505 + \frac{4cl}{d} + n z_u \right\} \frac{v^2}{64.4} \quad (181)$$

Ex. 84. A pipe 1 foot diameter, 500 feet long, has five quadrant, or right angled bends: the radius of curvature of each bend is 1 foot; the velocity of water through the pipe is 8.025 feet per second. What is the total head?

Cal. By Table 16, the coefficient corresponding to a velocity of 8 feet per second in a pipe whose diameter is $d = 1$ ft., is $c_f = .0052$.

Square of velocity divided by 64.4 ; 8.025×8.025

This series of articles will shortly be published in book form by Dewey & Co., Publishers of the MINING AND SCIENTIFIC PRESS, 252 Market St., S. F. Subscriptions for the book will be filled in the order in which they are received.

$$\div 64.4 = 1. \text{ In the present case } n = 5 \times \frac{6^\circ}{180^\circ} = 5 \times \frac{90^\circ}{180^\circ}$$

$$= 2.5. \text{ Ratio of the given radii, } \frac{r}{R} = \frac{.5}{1} = .5.$$

$$\text{By Table 20, when } \frac{r}{R} = .5, z = \frac{.2}{.5} = .294.$$

Substituting in (181) the values of $c_f = .0052$, $d = 1$ foot, $l = 500$ feet, $n = 2.5$, and $z_u = .294$.

$$h + h_u = (1.505 + 4 \times .0052 \times 500 + 2.5 \times .294) = 12.64 \text{ feet.—Ans.}$$

FLOW OF WATER THROUGH NOZZLES.

The resistance to the flow of water in conically convergent tubes, estimated for the smaller orifice, is less than the resistance in a cylindrical tube with equal orifice. Thus, Table 13 shows that the coefficient of velocity from a tube converging with an angle $3^\circ 10'$ is .894; and that the coefficient for a cylindrical tube of equal diameter is .829. Let t represent this ratio:

$$t = \frac{.894}{.829} \quad (182)$$

Let v = the experimental velocity of water in a cylindrical pipe, the ratio of whose diameter to length is as 1:10; v_1 = the theoretical velocity in same pipe; c_f = coefficient of resistance, varying from .006 to .004; c_u = mean coefficient of velocity with respect to the smaller orifice of the nozzles,

$$c_u = t \left\{ \frac{v}{v_1} \right\} \quad (183)$$

Substituting the values of $c_f = .004$, $d = 1$, and $l = 10$ in (128),

$$v = (2gh)^{\frac{1}{2}} \left\{ \frac{1.505 + 1.004 \times 10 \times 4}{1.505 + 1.004 \times 10 \times 4} \right\}^{\frac{1}{2}} = .775(2gh)^{\frac{1}{2}} \quad (184)$$

$$v_1 = (2gh)^{\frac{1}{2}}, \text{ as per Eq. (8).} \quad (185)$$

Substituting the values of v , v_1 , and t , in (183), $c_u = .836$, nozzle coefficient (186).

TABLE 22.

Flow of Water Through Nozzles.

Smaller diameter : to length : : 1 : 10 ; angle of convergence, $3^\circ 10'$.

Head. Feet.	DIAMETERS OF NOZZLES.							
	1 inch. Cu. ft.	1.5" Cu. ft.	2" Cu. ft.	2.5" Cu. ft.	3" Cu. ft.	3.5" Cu. ft.	4" Cu. ft.	4.5" Cu. ft.
10.	.115	.258	.458	.715	1.03	1.39	1.92	2.32
12.5	.128	.283	.510	.797	1.16	1.56	2.05	2.60
15.	.131	.315	.562	.875	1.26	1.72	2.25	2.84
17.5	.151	.340	.605	.94	1.36	1.85	2.42	3.06
20.	.162	.364	.647	1.02	1.46	1.99	2.59	3.28
22.5	.171	.386	.686	1.08	1.54	2.10	2.75	3.48
25.	.182	.407	.725	1.13	1.63	2.26	2.90	3.67
27.5	.190	.426	.768	1.19	1.71	2.32	3.03	3.84
30.	.204	.446	.811	1.26	1.81	2.48	3.24	4.10
32.5	.208	.464	.825	1.30	1.87	2.53	3.30	4.18
35.	.214	.482	.857	1.35	1.93	2.63	3.43	4.34
40.	.230	.520	.92	1.43	2.07	2.81	3.67	4.64
45.	.242	.553	.97	1.52	2.18	2.97	3.88	4.93
50.	.256	.583	1.04	1.60	2.30	3.13	4.09	5.25
60.	.273	.638	1.13	1.77	2.56	3.43	4.49	5.75
70.	.307	.690	1.22	1.92	2.75	3.75	4.88	6.16
80.	.328	.737	1.31	2.04	2.95	4.01	5.26	6.64
90.	.347	.778	1.39	2.20	3.06	5.54	5.54	7.00
100.	.366	.824	1.47	2.29	3.30	5.87	5.87	7.41
125.	.410	.92	1.64	2.56	3.67	6.75	6.55	8.26
150.	.449	1.01	1.80	2.80	4.03	7.20	7.20	9.07
175.	.485	1.09	1.94	3.02	4.36	7.78	7.78	9.80
200.	.518	1.16	2.07	3.23	4.59	8.28	8.28	10.45
250.	.584	1.31	2.32	3.62	5.22	9.29	9.29	11.75
300.	.635	1.43	2.54	3.96	5.67	10.15	10.15	12.88
350.	.686	1.54	2.74	4.28	6.16	11.98	10.98	13.85
400.	.733	1.65	2.93	4.58	6.59	11.74	11.74	14.82
450.	.778	1.75	3.11	4.86	6.98	12.46	12.46	15.71
500.	.820	1.84	3.28	5.12	7.38	13.10	13.10	16.60
550.	.859	1.89	3.44	5.36	7.56	13.75	13.75	17.01
600.	.899	2.01	3.59	5.61	8.13	14.36	14.36	18.06
700.	.95	2.21	3.92	6.11	8.86	15.70	15.70	19.93
800.	1.04	2.32	4.14	6.47	9.29	16.56	16.56	20.90
900.	1.10	2.48	4.39	6.87	9.90	17.57	17.57	22.27
1000.	1.16	2.60	4.64	7.24	10.40	18.58	18.58	23.40

Ex. 85.—A nozzle being 6 inches diameter at its discharge end, 5 feet long, will discharge under a head of 150 feet how many cubic feet of water per second?

Cal.—In "6-inch" diameter column, opposite 150 feet in "head" column, Table 22, the quantity sought is found = 16.13 cubic feet.

RELATIVE CARRYING CAPACITIES OF CLEAN, FOUL AND VERY FOUL WATER PIPES.

In the preceding discussion with respect to the carrying capacities of water pipes, they have been considered clean.

Assuming the coefficient of resistance for a clean pipe, .00644; for a rough or foul pipe, .0082; and for a very foul pipe, .012, then will the relative volumes of flow be:

For clean pipes, 1.0000;

For foul pipes, .8863;

For very foul pipes, .7325.

Rule 42.—In case a water pipe is rough and foul,

multiply the flow for a clean pipe in Table 17 (with same diameter, length and head), by 9, 8, 7, etc., according to the degree of foulness, as judgment shall dictate.

TABLE 22.

Flow of Water Through Nozzles.

Smaller diameter : to length : : 1 : 10 ; angle of convergence $3^\circ 10'$.

Head. Feet.	DIAMETERS OF NOZZLE.							
	5 inch. Cu. ft.	5.5" Cu. ft.	6" Cu. ft.	7" Cu. ft.	8" Cu. ft.	9" Cu. ft.	10" Cu. ft.	12" Cu. ft.
10.	2.86	3.46	4.13	5.60	7.69	9.29	11.44	16.48
12.5	3.19	3.86	4.62	6.26	8.18	10.40	12.79	18.44
15.	3.51	4.23	5.05	6.86	9.00	11.36	14.10	20.20
17.5	3.78	4.57	5.44	7.42	9.67	12.24	15.14	21.75
20.	4.04	4.89	5.83	7.93	10.35	13.12	16.18	23.32
22.5	4.31	5.17	6.18	8.41	10.98	13.92	17.17	24.74
25.	4.53	5.47	6.51	9.13	11.59	14.64	18.08	25.95
27.5	4.75	5.74	6.82	9.30	12.13	15.35	18.97	27.30
30.	5.07	6.14	7.29	9.94	12.98	16.39	20.27	29.14
32.5	5.15	6.33	7.38	10.10	13.20	16.72	20.62	29.72
35.0	5.35	6.47	7.72	10.49	13.73	17.36	21.40	30.86
40.	5.73	6.91	8.25	11.24	14.65	18.66	22.88	33.00
45.	6.06	7.34	8.75	11.89	15.59	19.79	24.26	34.98
50.	6.39	7.83	9.11	12.63	16.35	20.82	25.58	36.83
60.	7.00	8.48	10.11	13.73	17.92	22.71	28.03	40.39
70.	7.66	9.27	11.02	14.48	19.51	24.47	30.27	42.56
80.	8.19	9.91	11.81	16.06	21.02	26.57	32.36	46.65
90.	8.68	10.42	12.46	17.03	22.18	28.03	34.75	49.82
100.	9.15	11.08	13.18	17.95	23.47	29.65	36.63	52.70
125.	10.24	12.38	14.69	20.07	26.21	33.05	40.96	58.75
150.	11.21	13.57	16.13	21.98	28.80	36.29	44.86	64.51
175.	12.11	13.76	17.42	23.75	31.10	39.20	48.47	69.70
200.	12.91	15.76	18.58	25.38	33.12	41.80	51.80	74.30
250.	15.48	17.52	20.88	28.39	37.15	46.98	57.92	83.52
300.	15.86	19.20	22.90	31.09	40.61	51.52	63.45	90.58
350.	17.14	19.84	24.57	33.59	43.92	55.40	68.54	97.5
400.	18.31	22.16	26.35	35.90	46.94	59.29	73.27	105.4
450.	19.43	23.51	27.94	38.08	49.82	62.86	77.72	111.8
500.	20.47	24.79	29.52	39.60	52.42	66.42	81.92	118.1
550.	21.47	25.99	30.24	42.10	55.01	68.04	85.91	121.0
600.	22.44	27.14	32.11	43.97	57.46	72.25	89.74	128.5
700.	24.46	29.59	35.42	47.93	62.78	79.70	9.79	141.7
800.	25.89	31.43	37.15	50.76	68.24	83.52	103.6	148.6
900.	26.47	33.25	39.60	53.89	70.27	89.10	109.8	158.4
1000.	28.95	35.04	41.62	56.75	74.30	93.6	115.9	166.5

Ex. 89.—A long pipe, 6 inches diameter, has a fall of 18.48 feet per mile. What will be the flow in cubic feet per second, if its coefficient of discharge with respect to a clean pipe be .8?

Cal.—In Table 17, find opposite the given fall 18.48 feet, in discharge column, for a 6-inch pipe, .395 cubic feet. This is for a clean pipe.

Then by Rule 42, $.395 \times .8 = .316$ cubic feet.—Ans.

Pressure Ordinates.—A mean pressure ordinate is the vertical distance between the axis of the pipe and the hydraulic gradient. Thus in Fig. 19, CE is the hydraulic gradient, and $(ab+r)$, $(cd+r)$, or $(ef+r)$, is a mean pressure ordinate. If the axis of the pipe be depressed below the base, as represented in Fig. 19, by the dotted line, D, a, c, e , $E-ab$, cd or ef , will be the mean pressure ordinate for the given point, a , c or e . To find the value of the ordinate in pounds pressure:

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING FEBRUARY 2, 1886

- 335,500.—VEGETABLE CUTTER—De F. Bullock, Summit, W. T.
 335,219.—ORE CONCENTRATOR—W. A. Frank, Pinal, A. T.
 335,278.—PAINTER'S CLIMBING DEVICE—E. H. Gadsby, S. F.
 335,279.—SEWER TRAP COVER—C. W. Garland, Oakland, Cal.
 R 10,681.—TRAMWAY FOR CURVES, ETC.—A. J. Halliday, S. F.
 335,351.—FRUIT DRIER, A. J. Hatch, S. F.
 335,288.—SAFETY RAIL AND REIN GRIP FOR VEHICLES—F. W. Kroeber, St. Helena, Cal.
 335,459.—ROCK DRILL—E. Moreau, S. F.
 335,470.—ROCK DRILL—E. Moreau, S. F.
 335,309.—CUTTER HEAD—W. G. Kendall, Portland, Or.
 335,330.—FRUIT JAR—H. Wilcox, Los Gatos, Cal.
 335,495.—INSULATING MATERIAL—J. B. Williams, S. F.
 335,498.—ELEVATOR—J. H. Wisheart, Chico, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FRUIT JAR.—Harvey Wilcox, Los Gatos, Santa Clara Co. No. 335,330. Dated Feb. 2, 1886. This is a new fastening for the covers of fruit jars. The usual nail or clamp is so formed that there is a groove or guide in its center. Through this groove, between the clamp and cover, passes a piece of spring-wire of an elongated U-shape. It is convexed in the direction of its length. This is claimed to be better than wedges, as any shrinkage is overcome by the spring keeping the cover down tight. The cover of the jar is perfectly smooth on top, the guide for the spring being in the ball or clamp. The use of the spring affords a constantly adjustable pressure, which provides against any loosening of the cover by the shrinkage alluded to, and for any that takes place, the spring has simply to continue its pressure to keep the joint tight.

FRUIT DRIER.—Andrew J. Hatch, S. F. No. 335,351. Dated Feb. 2, 1886. The invention relates to that class of fruit driers in which a horizontal longitudinal drying chamber is employed, and in which the trays containing the fruit are inserted upon rolling trucks or cars, hot air being supplied to the drying chambers from a suitable heating chamber beneath it, and caused to pass through by means of a suction fan-wheel. The invention consists in certain improvements which may be briefly enumerated as follows: Means for providing a reversible draft of hot air horizontally through the drying chamber—that is to say, changing the direction of said draft from one end of the drying chamber to the other, as may be desired; a peculiar distributor placed within the drying chambers above the hot air apertures communicating with the heating chamber; a device used in connection with the suction fan for preventing the rotary motion of the air, and a means for inserting the ear or truck with its trays without unduly exposing the drying chamber to the influence of the outer air.

FUEL OF THE FUTURE.—The house of the near future will have no fire-place, steam pipes, chimneys or flues. Wood, coal oil and other forms of fuel are about to disappear altogether in places having factories. Gas has become so cheap that already it is supplanting fuels. A single jet fairly heats a small room in cold weather. A New York artist has produced a simple design for heating entirely of gas at a mere nominal expense. It is a well known fact that gas throws off no smoke, soot or dirt. The artist filled a brazier with chunks of colored glass and placed several jets beneath. The glass soon became heated sufficiently to thoroughly warm a room 10x30 feet in size. This design does away with the necessity for chimneys, since there is no smoke, the ventilation may be had at the window. The heat may be raised or lowered by simply regulating the flow of gas. The colored glass gives all the appearance of fire; there are black pieces to represent coal, red chunks for flame, yellowish white glass for white heat, blue glass for blue flame, and hues for all the remaining colors of spectrum. Invention already is displacing the present fuels for furnaces and cooking ranges, and glass doing away with delay and such disagreeable objects as ashes, kindling wood, etc.

It is said that shingle may be made fire proof by setting the butts into a trough of water, in which a half bushel each of lime and salt, and six pounds of potash have been dissolved,

USEFUL INFORMATION.

Removal of Paint and Varnish.

Where it is requisite to remove painting entirely from its ground, it is usual to resort to mechanical scraping, etc., or to the very dangerous operation of setting fire to the painted surface immediately after washing it over with oil of turpentine, called turps, an operation that may be safely and more easily accomplished by laying on a thick wash or plaster of fresh-slacked quicklime, mixed with soda, which may be washed off with water the following day, carrying with it the paint, grease, and other foulness, so that when clear and dry, the painting may be renewed as on fresh work. Clear colling is sometimes resorted to over old painting, for the purpose of repainting, in which case the surface exposed to the sun's rays or alterations of temperature is liable to become blistered and scale off. Varnish may be removed by friction. If it be a soft varnish, such as that of mastic, the simple rubbing of the finger-ends, with or without water, may be found sufficient; a portion of the resin attaches itself to the fingers, and by continued rubbing removes the varnish. If it be a hard varnish, such as that of copal, which is to be removed, friction with sand or river sand, the particles of which have a roundness that prevents their scratching, will accomplish the purpose. The solvents commonly employed for this purpose are the several alkalies, alcohol and essential oils, used simply or combined. Of the alkalies, the volatile in its mildest state, or carbonate of ammonia, is the only one which can be safely used in removing dirt, oil and varnish from a picture, which it does powerfully; it must therefore be much diluted with water, according to the power required, and employed with judgment and caution, stopping its action on the painting at the proper time by the use of pure water and a sponge. A thick coat of wet fuller's earth may be employed with safety, and, after remaining on the paint a sufficient time to soften, the extraneous surface may be removed by washing, leaving the picture clean. An architect of the author's acquaintance has succeeded in a similar way in restoring both paintings and gilding to their original beauty by coating them with wet clay. Ox-gall is even more efficacious than soap.

In filling cracks and replacing portions of the ground, putty formed of white lead, whiting, varnish and drying oil, tinted somewhat lighter than the local colors require, may be employed, and in some cases, also, plaster of Paris. In restoring colors accidentally removed, it should be done with a vehicle of simple varnish, because of the change of tint which takes place after drying in oil.

THE WHEEL PARADOX.—The question is often asked: "Does the top of the wheel go faster than the bottom, or just as fast?" A cotemporary answers this question as follows: "When a wheel is put in motion every part of it starts at the same moment, and when its motion is stopped, every part stops at the same moment, and the speed is uniform at every point. This is true whether the wheel is simply revolving on its axis or resting on the ground, though in the latter instance it has also a forward movement besides the circular movement around its axis. The forward movement is also exactly uniform in every part. Some newspaper writer has attempted to prove a paradox, arguing that the bottom of the wheel goes backward or remains stationary for a moment while the top is going forward. In going forward, the wheel, in one revolution, traverses a distance equal to its circumference. Every point on the wheel makes exactly the same distance, starting and stopping at the same distance with each other, which would not be the case if one part moved faster than the other—a thing impossible. The line described by any point in the circumference of a wheel moving on a plane, from the time it leaves the ground until it touches it again—in other words in making one complete revolution—forms a cycloid, and in making the next revolution, every point on the circumference, whether at the top or bottom, continues forward at the same rate, starting immediately from where the last revolution left it. For a complete explanation of the principle, the querist is referred to the discussion of the cycloid in Cherré's "Calculus," or any treatise on the cycloid."

A SINGULAR MILL FIRE.—Mr. C. J. H. Woodbury relates the following curious circumstances to illustrate the singular and unexpected origin of fires: One evening a June bug flew into the carding room of a cotton mill, which was in operation day and night. The leg of the insect caught a piece of roving and it flew into a gas light; the roving caught fire, and, dropping into a can of cotton sliver, ignited that and started a blaze, which would have been serious had it not been for the presence of mind of an operative, who smothered the fire by covering the top of the drawing can with his coat.

PREFERENCES IN BOILERS.—When we are questioned as to our preference in the boiler line, says a cotemporary, we always require to know how, where and for what the boiler is to be used. A boiler which will furnish steam with the least expense for fuel and repairs in a New England cotton mill might be the most inconvenient and expensive that could be used

in a portion of the country less favored as to water. A boiler which would furnish admirably the low pressure and quantity of steam required for heating purposes, might be entirely at a loss under the high pressure, and the more intense combustion requisite as a source of power. The locomotive boiler is particularly adapted to its special work. It gives us the maximum power in the smallest space and with the lightest weight, yet it would hardly be the most economical or desirable boiler, all things considered, for most stationary plants. When a man talks one boiler straight through thick and thin, for all purposes, and in all conditions, it is safe to conclude that he has an interest in that boiler, or that he does not know what he is talking about.

BUT, IT IS NOT BUTTER.—Certain parties have contrived an ingenious process for getting the caseine out of milk, along with the fatty particles, and so producing a white mass that is erroneously termed butter. Of course, it isn't butter, any more than a compound of a small portion of real butter and a large portion of "hull fat" would be. The caseine has no place in genuine butter, but they get four pounds of the stuff out of a gallon of milk, and can produce it at five cents a pound; so no doubt there will be people who will betray their palates with it. The exploiters of the process are trying to sell State rights for manufacture, and have actually found a person to buy the right for England. The cook expert has figured it out that their so-called secret consists in allowing milk to stand in a warm temperature until it is sour and thick, when it is put in a churn. A quantity of melted old butter is added, and after it is churned for some time rennet is added, which solidifies the curd with the fat of the milk. Of course this hogus butter will not keep sweet any length of time.

METHOD IN WORK.—With most people, says a sensible writer, the want of a well defined system or method is one of the chief causes of their getting behind hand with their work. A systematic method of working combined with industry, will complete a vast amount of work in a day and finish it with ease; but without system and application, the worker may be in a continual rush, and yet accomplish little.

THE WEeping WILLOW seems to have had a romantic history. The first scion, it was said, was sent from Smyrna in a box of figs to Alexander Pope. General Clinton brought a shoot from Pope's tree to America in the time of the Revolution, which, passing into the hands of John Parke Curtis, was planted on his estate in Virginia, thus becoming the progenitor of the weeping willow in America.—*The Garden.*

THE SIGNS + and —, it is said, were first used by Christopher Rudolph about 1524. The sign = was first employed by Robert Recorde in 1557, because, said he, "noe 2 thynges can be moare equalle."

GOOD HEALTH.

Checked Perspiration

Is the fruitful cause of sickness, disease and death of multitudes every year. If a tea-kettle of water is boiling on the fire, steam is seen issuing from the spout, carrying the extra heat with it, but if the lid be fastened down and the spout be plugged, a destructive explosion follows in a very short time.

Heat is constantly generated within the human body, by the chemical disorganization, the combustion of the food we eat. There are seven millions of tubes or pores on the surface of the body, which in health are constantly open, conveying from the system by what is called insensible perspiration this internal heat, which having answered its purpose, is passed off like the jets of steam which are thrown from the escape-pipe, in puffs, of any ordinary steam engine; but this insensible perspiration carries with it, in a dissolved form, very much of the waste matter of the system, to the extent of a pound or two or more every twenty-four hours. It must be apparent, then, that if the pores of the skin are closed, if the multitudes of valves, which are placed over the whole surface of the human body are shut down, two things take place. First, the internal heat is prevented from passing off, it accumulates every moment, the person expresses himself as burning up, and large draughts of water are swallowed to quench the internal fire—this we call "fever." When the warm steam is constantly escaping from the body in health, it keeps the skin moist, and there is a soft, pleasant feel and warmth about it. But when the pores are closed, the skin feels harsh, and hot and dry.

But another result follows the closing of the pores of the skin, and more immediately dangerous; a main outlet for the waste of the body is closed, it remingles with the blood, which in a few hours becomes impure, and begins to generate disease in every fiber of the system—this whole machinery of the man becomes at once disordered, and he expresses himself as "feeling miserable." The terrible effects of checked perspiration of a dog, who sweats only by his tongue, is evinced by his becoming "mad." The water runs in streams from a dog's mouth in summer if exercising

freely. If it ceases to run, that is *hydrophobia*.

It has been asserted by a French physician that if a person suffering under *hydrophobia* can be only made to perspire freely, no is cured at once. It is familiar to the commonest observer, that in all ordinary forms of disease, the patient begins to get better the moment he begins to perspire; simply because the internal heat is passing off, and there is an outlet for the waste of the system. Thus it is, that one of the most important means for curing all sickness, is bodily cleanliness, which is simply removing from the mouths of these little pores, that gum, and dust, and oil which clog them up. Thus it is, also, that personal cleanliness is one of the main elements of health; thus it is that filth and disease habitate together the world over.

There are two kinds of perspiration, *sensible* and *insensible*. When we see drops of water on the surface of the body as the result of exercise, or subsidence of fever, that is *sensible perspiration*, perspiration recognized by the sense of sight. But when perspiration is so gentle that it cannot be detected in the shape of water drops, when no moisture can be felt, when it is known to us only by a certain softness of the skin, that is *insensible perspiration*, and is so gentle that it may be checked to a very considerable extent without special injury. But to use popular language which cannot be mistaken, when a man is sweating freely, and it is suddenly checked, and the sweat is not brought out again in a very few moments, sudden and painful sickness is a very certain result.

What then checks perspiration? A draft of air while we are at rest, after exercise, or getting the clothing wet and remaining at rest while it is so. Getting out of a warm bed and going to an open door or window, has been the death of multitudes.

A lady heard the cry of fire at midnight: it was bitter cold; it was so near the flames illuminated her chamber. She left the bed, hoisted the window, the cold wind chilled her in a moment. From that moment until her death, a quarter of a century later, she never saw a well day.

A young lady went to a window in her night-dresses to look at something in the street, leaning her unprotected arms on the stone window-sill, which was damp and cold. She became an invalid for life. The great practical lesson which we wish to impress on the mind of the reader is this, When you are perspiring freely, *keep in motion*, until you get to a good fire, or to some place where you are perfectly sheltered from any draft of air whatever.—*Hall's Journal of Health.*

HIP POCKETS.—The general practitioner is frequently asked by anxious parents: "What shall I do for my boy; he is getting so awfully stoop-shouldered that I am afraid he will get consumption; I will have to get him a brace. What kind would you recommend?" It requires no extended argument to prove the importance of a well-expanded chest. Apart from the incalculable benefits to health, an erect carriage and graceful movements attract the attention of the most humble. It causes them to correct as far as they are able, in their children any tendency to awkward, stooping or ungainly positions. Apart from the cost and inconveniences of expensive instruments, but few meet the requirements. In many cases better results may be obtained by attending to a few simple details, within the reach of every one, in the ordinary clothing. The boy's pockets are to him a very important part of his dress, and the natural tendency is to keep his hands in them. When not actively engaged, there they are usually found, and if the pockets are properly placed, they will inadvertently cause him to throw back the shoulders and more or less expand the chest. For instance, the jacket or overcoat should have what is called breastpockets, the opening should be high and as far back as possible, parallel with and in the line of the body, instead of low down and transverse, as usually found in the ordinary jacket or overcoat. The pants should have what are called "hip pockets," and no others. It will then be apparent that, whilst the hands are in the pockets a better, if not a perfect, position will be assumed and the boy spared the many admonitions to "Keep your hands out of your pockets," and the accompanying box on the ear.

HYPODERMIC MEDICATION.—In an editorial in the September number of the *St. Louis Medical and Surgical Journal*, the editor wisely remarks that with but few exceptions medicines produce their effect by absorption, regardless of the locality of administration. Experimentation long since demonstrated that remedies given subcutaneously and in smaller doses act much more rapidly than when introduced by the stomach, and a knowledge of this fact enables the practitioner to deal successfully with many conditions otherwise uncontrollable. The advantages afforded through this instrumentality are not as freely grasped as would naturally be supposed, physicians generally limiting such medication to the injection of morphia, mainly for the relief of neuralgia. This literature of the subject has been insufficiently studied, and the average practitioner has consequently remained satisfied with the stereotyped methods of medicating. Perhaps, too, the disinclination of the physician to inflict even the minimum of pain incident to the introduction of the needle, coupled with the aversion of most patients to any procedure, even remotely allied to surgery, have operated as deterrents to the general adoption of hypodermic medication.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SOUTH SPRING HILL.—*Amador Ledger*, Feb. 6: This mine continues to move along prosperously. The air compressor and drilling machinery are on the ground, and in process of being put in position. It is the intention to commence sinking another shaft almost immediately. This shaft will be located southeast of the present shaft, and nearly midway between the old shaft and the mill. It has been decided to make it vertical, the present shaft being on an incline. The mill is crushing about 40 tons of ore per day, or an average of two tons to the stamp. This is a much lower average than at the Zeile or Keystone, the former mill of 40 stamps reducing over 130 tons per day, more than three tons to the stamp, and the latter averaging about 2½ tons per stamp. At the South Spring Hill, however, the ore is of finer grade, and requires to be crushed finer, a much finer grade of screens being used. Since the 20 stamps have been in motion, the monthly output of gold has been \$75,000, an average of over \$12 per ton. The trial between the Frue and Triumph concentrators was brought to a close the first of this month. The result of the test we are not in position to announce definitely, although it is admitted that both are first-class machines, and furthermore, that on whichever side the advantage rests, it is not of such a decisive character as to definitely settle the question of superiority between these rivals.

MISCELLANEOUS.—The big tunnel at Middle Bar is in a distance of 3200 feet. A slight turn to the eastward has been given lately in the direction of the work, as it is believed that the ledge will be reached quicker by that course. We understand that capitalists are negotiating for the purchase of the whole or a large interest in the Doyle quartz claim, in Hunt's gulch. There is every prospect of this proving a good paying property. The daily cleanup of the plates at the Moore mill has been highly satisfactory, leaving no room for doubt that the rock will pay handsomely. The water in the Kennedy mine has been reduced below the 600 level. The work of draining the mine progresses much more rapidly than was anticipated.

Calaveras.

MURPHYS.—*Cor. Calaveras Citizen*, Feb. 13: Perhaps there is no place in this vicinity that so attracts the visitor, as the Oro Plata mine and works. The mine is located on a prominent elevation several hundred feet higher than the townsite. The works are extensive, covering a large area of ground, complete in its various departments in working its ores, and for simplicity of machinery, thorough practicability in arrangement of everything in and around the mill and mine challenges the admiration of the visitor. The mill with its stamps and pulverizers started up on the first of January, after extensive preparations had been made to facilitate work in mine and mill, and was in successful operation until some days ago, when the management were compelled to succumb to the inclemency of the weather. The incessant rain of the days and weeks previous started the banks of the excavation which in falling covered the mouth of the chute, and from the great weight crushed the timbers and damaging the underground works. The aperture thus closed, filled with water, endangering the lives of the miners, should they undertake to clear the tunnel. Supt. Morse doubtless with the humane desire to not risk life, stopped worked, went below and purchased a centrifugal pump and in less than ten days had it placed in position and the water pumped out of the excavation and men set to work again in safety. A donkey engine placed on the brink of the excavation furnished the power, and in less than 24 hours the water was pumped from the great pit. The pump worked to a charm and claimed the admiration of all who witnessed its splendid working, and all are enthusiastic in its praise. The pump will always be in readiness hereafter on occasions of extreme bad weather. The mill will in a short time be in successful operation, and will give a good account of itself. More plates are being added as the extreme fine gold necessitated it. There can be no doubt as to the final success of the company's working the ore on a paying basis, and the mine in the near future will be numbered among the best in the State. The Johnny Saltaire mine on Indian creek bids fair to become one of the best properties in this vicinity. Supt. Adams of this place who bonded the mine is vigorously prosecuting the work, and a depth of nearly 70 feet has been attained. The lode at this depth keeps up its high reputation at commencement, and would delight the eye of an expert. It is fully five feet wide with gold plainly visible through it.

WEST POINT.—*Calaveras Chronicle*, Feb. 13: This district is situated in the northern portion of Calaveras, and borders on Amador county, and is isolated to a degree that almost skirts on obscurity. Its area does not exceed 25 square miles in extent. There have been several hundred mines found here, and they have yielded from a few hundreds to several hundred thousands worth of ore respectively. The deepest mine worked has not exceeded 900 in depth. There are about five good mines in the whole district, which by good management can be made to pay dividends and the rest are nonentities, and capitalists have been working all around those five for the last twenty years, with the exception of one, whose development has exceeded all anticipation, and that is, namely, the Lockwood, the other four will result the same when worked. The prices asked for them have not fitted the coffers of investors here, hence their being neglected, causing seams to be prospected to the utter condemnation of those valuable ledges. This camp has not had a fair test yet, and awaits the helping hand of a powerful company to develop the few principal mines in this district in a proper shape.

Fresno.

FRESNO FLATS.—*Cor. Expositor*, Feb. 10: Miners have gone to work at the Texan Flat mine. The owners will put up new hoisting works and other machinery on the mine as soon as the roads are in good condition and large teams can travel. I hear that from four buckets of dirt taken out of the Surprise mine \$9,000 were obtained. This mine was lately bought from the McDonald brothers by

Thomas Ewing. It is one of the best mines in these parts among those that have been opened up. The owners of the Lucky Bill mine—Messrs. Baker, Oxendine, Crane and Westfall—are running a tunnel to tap the bottom of their shaft, which is about one hundred feet deep. They have gone in about one hundred and twenty-five feet, and have about twenty-five feet more to run. Every indication shows that this mine on a true fissure lode. They have taken out, with very little work, \$6,000. The rock was milled at the Enterprise mill, and worked \$55 per ton. After the tunnel is in they expect to run a winze and cut the vein. I can't say how far down they expect to go. I know they would not sell the mine to-day for \$50,000. Messrs. Lyon & Day have bonded the Confidence mine for one year. They are prospecting the same with the intention of putting up works. They speak well of what they have seen so far. This is the mine that thousands of dollars were taken out of by Dolds and others some few years ago. There is a ten-stamp mill on the property. Messrs. Lang & Co. are quietly going on with work at their mine on Deadwood. They make a shipment of bullion every few weeks by Wells, Fargo & Co. They have a good property, and have one of the best mills of the kind—five stamps—in the county. Mr. Lang deserves great credit for his enterprise. He is a man who will make ends meet wherever he is.

Inyo.

SWANSEA FURNACE.—*Independent*, Feb. 10: The furnace at Swansea was temporarily shut down at the end of last week, the supply of coal and coke having been exhausted. Up to the time of the stoppage the furnace had been running twenty days. The amount of bullion turned out in that time was 135 tons, \$240 a ton; total value, \$32,400. It is expected that about 60 tons more bullion will be produced when work is resumed and the whole run finished; this will bring the total value of the run up to \$46,800. A good proportion of this large sum will be got from slag, the refuse of former workings at Cerro Gordon and Swansea. This shows how much improvement has been made on former methods of smelting. It also shows how much the mining business of the district may be extended; ores formerly thrown away as being too low grade to pay for working can now be worked at a fair profit; and as there is a very large quantity of such ores in the district the business is very likely to grow to large proportions.

CHRYSOPOLIS ORE.—Last Wednesday Mr. W. A. Bolinger made a shipment of gold bullion worth \$600 taken from a sample lot of fifty tons of ore from the Eureka mine at Chrysopolis. Mr. Bolinger thinks that from three to four hundred dollars worth of gold yet remained to be cleaned up from the battery when the shipment was made. The ore was crushed at the Maxim mill. The vein from which this ore was taken is six to eight feet wide, and the sample would scarcely be up to the average value of the whole ledge. Mr. Bolinger says that with a little more work on the mine he could open up ground enough to supply ore for a twenty stamp mill.

KEYNOT.—The old Mexican who discovered the Keynot mine years ago recently returned to the mine and went to work. In a day or two he struck a small vein of ore, not over eight inches wide, but it goes over two hundred dollars per ton. The old man is not able to work more than three or four hours a day, but even at that he can make good wages. Ten other miners are working in the mine on tribute. All are doing well.

CLOSED.—*Register*, Feb. 11: Thursday last, Gorman & McKenzie, the lessees, closed down the Hawley furnace for the usual repairs, and to get a sufficient supply of ore and coal ahead. They will start up again about Monday next. Quite a number of men and teams are constantly employed. Messrs. G. & M. have reduced the price of reducing lead ores to \$17 per ton.

SNOW CANYON.—An item in last week's issue stated that rich gold ore had been struck in one of Eddy's mines in Slate Range district. This was a mistake; the strike was made in Snow Canyon, and promises to be of importance. Mr. Eddy is now running the mill with quite satisfactory results.

YGNACIO MINE.—An iron ore car was sent down from Independence to the Ygnacio mine, at Cerro Gordo, yesterday. The present owners of the mine appear to be intent on working the mine extensively; their operations are being extended.

Monterey.

THE MONTEREY COAL MINE.—*Monterey Argus*. As soon as a patent is received for the Sur Chiquito Rancho, it is the intention of the owners to commence operations at this mine. As there will be plenty of capital to back the enterprise this time, there is no doubt but that the mine will be successfully worked. The product will be shipped to San Francisco in the shape of coke, works for burning it to be erected at the cove landing at Point Lobos.

Nevada.

AT THE CROWN POINT MINE.—*Grass Valley Union*, Feb. 30: The rich quartz taken out of the Crown Point mine a few days ago excites the admiration of all who have seen it, as some of the streaks of pure gold are nearly a half-inch in thickness. The rock was taken out of the stope in the southeast drift of the 880-foot level, where the ledge and ledge matter is from six to seven feet between walls, and not far from the end of the drift, which is in 275 feet from the shaft. The general character of the rock being taken out is excellent, averaging about \$25 per ton. No waste is now coming out of the mine, the vein being so wide that there is no occasion for the removal of waste material. Six men underground and a carman send up enough quartz to keep the ten-stamp mill constantly going. The mill is run by free water taken from Wolf creek, but is soon to be supplied by 775 inches of water through the new Idaho ditch, which will give 45 feet more fall than is obtained now, and will furnish more power for opening other levels that are contemplated. The water-wheel that drives the mill is 34 feet in diameter, while a six-foot Pelton is used for hoisting and pumping purposes. The work of reopening the 300 level, which is 120 feet below the level that is now furnishing quartz for the mill, is now progressing. No work has been done on this level since 1871 (which was by the former owners) and it is found that the shaft contains much mud and slime, which has to be removed. This work will require fully three weeks more, when the work of exploitation will be commenced. There is every

reason to suppose, from the good developments which have been made on the 180 level that the 300 level will prove equally as good; and the continuance of the vein at its present large size will give an extent of backs that will require more extensive milling facilities, which will be obtained by putting in the mill ten additional stamps. Everything points to the Crown Point becoming a great mine.

THE TEXAS MINE.—*Transcript*, Feb. 13: Last Thursday afternoon the Texas Company made what is now considered an important strike in their tunnel. For a long time they have been running a tunnel to tap some of their ledges, and on the day above mentioned a ledge of fine-looking quartz was found, which prospects better than anything heretofore found in that section of the Willow Valley district. The size of the ledge is not known, but it is believed to be three or four feet. Rock containing free gold is seen in the ledge, and it is believed now that they are about uncovering a pay chute. If this proves true, some half dozen other claims will be started up immediately, as by this strike the pay chute of that section will be easily traced. There is more quartz in that section near the surface than in any other part of the district, but the trouble has been that the assays were always very low. Years ago it was predicted that if ever a pay chute was discovered in the Texas, or adjoining ground, and no one doubts its existence, Willow Valley would be the liveliest mining district in the county. It will take several days to ascertain the importance of the strike at the Texas. The Jones boys have struck a fine-looking 18-inch quartz ledge in the Willow Valley district. They have already had one crushing which paid them beyond their expectations, and have now on their dumps about 25 tons.

IMPROVEMENTS AT THE EMPIRE MINE.—*Grass Valley Union*, Feb. 12: Very extensive improvements are being made to the Empire mill on Ophir Hill. Another large mill building has been erected alongside of the present 20-stamp mill, in which there will be room for 40 stamps, although it is contemplated to put in but 20 at this time. The new addition will be provided with rock-breakers, grizzlies, ore bins and self-feeders, to provide against the least possible handling of the quartz after being dumped upon the upper platform. Another large building has been erected for pan rooms, concentrators, etc., which will make the establishment the largest in the district, and looks to the providing of mill power to work the mine on an extensive scale, which is in contemplation, as there are large bodies of low-grade ore in the mine that it is proposed to extract when water power is introduced to supplant the use of steam, as the cost of reduction will then be greatly reduced. The new improvements are all being made with a view to the introduction of water power, and the work of providing the necessary canals, reservoir and pipe line has already been commenced, and will be pushed with all possible speed—the intention being to have the water power available to run the works by the first of May.

Placer.

AT WORK.—*Placer Co. Republican*, Feb. 13: Charles Harley has begun work on the Campbell ground at Forest Hill. A Cornish pump has been put in operation with a steam pump ready in case of any accident to the former. The Pearson and Hawken brothers have made another clean-up at the Three Stars from a twenty-five days' run. During that time they have crushed 200 tons quartz which yielded 197 ounces. The gold brings \$13.79 an ounce. At the Live Oak mine near Forest Hill, the shaft has been sunk 122 feet to bed rock which was found to dip to the south at a sharp angle. The shaft will be sunk fifteen or twenty feet more before a tunnel is begun. The owners are much encouraged by the gravel found on the bed rock. The principal stockholders are Messrs. Cray, Chappellet, and Kates.

Plumas.

ONION VALLEY ITEMS.—*Plumas National*, Feb. 13: Snow is six feet deep in Onion valley. A new bed of gravel has been struck in the Buckeye mine. It prospects well and all rejoice. Foreman Aug. Holtz is of the opinion that it is an extensive find. The Blue Lead on Poorman's creek is being opened up by Messrs. Macaulay, Kelley and Mullen. Their work has discovered a fine lead of gravel and the gold taken out is of a superior quality. Mr. Keifer has just completed an expensive section of his tunnel through a bed of hard cement. However, he feels recompensed, as he struck upon a fine channel of gravel which prospects well. As work progresses in the hill the American proves better.

San Bernardino.

NEEDLE NOTES.—I had an interview with the shippers of ore to Kingman to the mines north of Goff and the A. & P. R. R. The mines that are opened and owned by Messrs. Heise & Raver, are turning out splendid. The Fearnought mine was worked about six days, and the owners realized a clear profit of about \$20 (one man's work). The assay of ore out of the mine goes from \$110 to \$600 to the ton. Heise & Raver own a group of mines called the Fearnought, Buckeye, Bullion, Mollie, Garfield, Morgan and Gertrude; and development will be pushed upon them. Mr. Frank Nicholson & Co. have leased three of said mines, and are making preparations to go to work at once. Messrs. Fisher & Co., have a prospect of doing well on their locations. Messrs. Higgins & McDonald claim to have ore that assays \$800 on their locations. The outlook of the new mines is bright, as the ore pays from the grass-roots down. Three Mexicans just returned from prospecting, for the last fifteen days, out near Old Woman's mountain, report "no find" of placer or other diggings. There is no excitement here now about the mines.

ARROW GOLD DISTRICT.—*Calico Print*, Feb. 14: Arrow mining district continues to hold its own with what development that is being made. Several old prospectors are chloriding on the smaller veins and freighting their ore to Fenner station to be shipped to the best reduction works. Some work has been commenced on the main ledge on a few of the claims. Prospecting still goes on. Johnny Carter found quite a rich vein of gold about three miles from Providence. Several other locations were made in same vicinity. There is now almost a continuous gold belt from Kerr's Perseverance mine about a mile north of here to Granite Pass, 16 miles south of here on the east side of Providence range of mountains.

BONANZA KING CO.—Rumors are rife that this

company with the certainty of the coinage of silver not being disturbed are about to commence operations again. What truth is in the report your correspondent sayeth not.

MESCAL—CAMBRIA MINE.—Expert Roberts who bonded the Cambria mine of Mescal for Los Angeles parties, is on his way out to start up the works.

Shasta.

IRON MOUNTAIN.—*Courier*, Feb. 13: Iron Mountain is situated seven miles north of Shasta, and is connected with this town and the railroad station at Middle Creek by a good turnpike road constructed at thousands of dollars expense. The Mountain, which rises several thousand feet above the bed of the Sacramento river, appears to be a mass of gold and silver ore. The Lost Confidence ledge crops out on an average, three hundred yards in width and a mile in length. Shafts have been sunk on this deposit to the depth of about a hundred feet, and tunnels and cross cuts run from them in every direction, and no termination of the ore body has been discovered. Some six months ago this mine was sold to San Francisco capitalists for \$750,000. The new owners organized a company, appointed A. M. Ellsworth superintendent, and projected reduction and milling works on a scale never before equaled in this part of the state. For months, the heaviest machinery has been freighted to Shasta station at Middle Creek, and the heft on the loaded wheels have taxed the long train of Lee Fader's powerful teams to pull the heavy equipments of the mine up to the mountain, where the question of the value of that mammoth deposit will be practically tested. The Silver King mine near Centerville, the ledge discovered by Brinard and Lowery, is said to show about as good rock as any discovered on the upper portion of the Reading Grant, and experts affirm that the Decker mine on Bulgin Gulch is the best thing discovered in the mineral line in the county except Iron Mountain which is a world-bearer.

Sierra.

MONTHLY CLEANUPS.—*Fribune*, Feb. 10: At the Young America mine \$14,600 was cleaned up this week as a result of last month's run. Owing to the heavy fall of snow at the mine considerable delay occurred in the delivery of ore to the mill, which accounts for the falling off from the amount realized in December. Thirty-two hundred dollars in bullion was brought down from the Cleveland quartz mine this week. The Cleveland is looking well and the owners have cause to feel in jubilant spirits. It is currently reported that the Sierra Buttes mine yielded about \$50,000 for January.

Trinity.

MINERS AT WORK.—*Trinity Journal*, Feb. 13: Miners are at work all over the county, both in quartz and placer mines. The season of 1886 will be one of the most prosperous Trinity county has experienced for a number of years.

NEVADA.

Washoe District.

CHOLLAR.—*Enterprise*, Feb. 13: On the 3100 level a force of men are employed in repairing the timbers and straightening up the main lateral drift south, which extends to the Potosi line. The drain boxes are all right, and carrying off the water encountered at that point. Superintendent Hamilton is in San Francisco at present, and in case it should be decided to go ahead with this drift and push into or through the Potosi ground, it could be done with the most perfect facility. The main pump rod of the Cornish pump in the Combination shaft broke yesterday morning, yet that will make no difference to the drainage of this or the other two middle mines, as the hydraulic pump, in connection with the bailing tanks, meet the requirements of the situation all right. Sinking the Combination shaft deeper is in contemplation, and liable to be resumed shortly.

CON. CALIFORNIA AND VIRGINIA.—The last official report from the mine says: On the 1400 level the west drift from the C. and C. shaft has been extended 87 feet; total length, 364 feet. On the 1650 level the northwest drift has been extended 25 feet; total length, 527 feet. On the 1950 level the old west drift from the station in the C. and C. shaft is being reopened. During the week 89 tons and 1735 pounds of ore were shipped to the Morgan mill, and 1653 tons and 1880 pounds to the Eureka mill. The average value of the ore milled during the week, according to the battery sample assays, was \$75.22 per ton for that crushed at the Morgan mill, and \$13.07 per ton for that crushed at the Eureka mill. During the week bullion valued at \$64,736.69 was shipped to the office in San Francisco.

HALE AND NORCROSS.—The bottom of the deep winze from the 3000 level has attained a depth of 25 feet below the 3200 level, thus forming a sump for the reception of any possible water which may be encountered. Superintendent Keating, now in San Francisco, is liable in a day or two to order the deeper sinking of the winze to be stopped and drifting both south and north to be commenced, to connect with the proposed 3200 level of the Combination shaft, and also to explore and develop the rich diamond drill prospects developed recently near the Savage line below the 3100 level.

YELLOW JACKET.—Still yielding the usual amount of ore from the old upper levels and keeping the Brunswick mill steadily running. The Golden Gate concentrator in use at this mill is a very good success, so far as concentrating a certain portion of the ore from the mine containing free gold and heavy black sulphuret of silver, but it does not and cannot concentrate the chloride ore, which composes seven-eighths of the ore deposits of the Comstock lode.

UNION CONSOLIDATED.—On the 500 level a new lateral drift north has been started from the east crosscut, at a point 360 feet east of the main north lateral drift, No. 1. It is being run in a very favorable ore vein formation and is already in 90 feet, showing very encouraging material.

OPHIR.—On the 300 level the west drift from the old Mexican shaft is now in 152 feet, 32 feet having been added during the week. On the 400 level the lateral drift running north from the west drift from the old Mexican shaft has been extended 33 feet, making a total of 243 feet.

CROWN POINT.—Ore extraction goes steadily ahead from the old upper levels, with a goodly contribution of better grade from the 1700 and 1750 levels. Some very good grade ore is also coming

from the Belcher mine, which is worked through the Crown Point.

GOULD AND CURRY.—Since starting the pumps the water has been reduced in the Osborn shaft, of this mine and the Best and Belcher over 200 feet, and it is being lowered at the rate of 10 or 12 feet per day. The machinery works splendidly.

SIERRA NEVADA.—On the 520 level the main north lateral drift continues in a very dry porphyry formation, with occasional streaks of quartz and clay. Its total length is 1751 feet, 28 feet having been added during the week.

ALTA.—On the 700 level the lateral drift north toward the Benton ground continues making fine progress in good working ground.

Columbus District.

HOLMES.—Candelaria *True Fissure*, Feb. 12: Sixty feet west of Cross development we have a good stop of ore. The Creer has improved very much during the past week. The stop is increasing in length. It is 12 feet wide and the ore is good. The drift running west from Creer has 3 feet of very high grade ore. The silver stop 4th level looks well. We have a prospect at this point. The ore averages \$150. Everything at mill and mine is in good order and doing good work. We ship you by this day's express 19 bars of bullion valued at \$88,018.09.

MR. DIABLO.—We have connected the shaft from the lower intermediate, between the 1st and 2d levels with upper intermediate between these levels by a south cross-cut, and have 4 feet of \$50 ore at the place of connection. This raise is now as high as the 1st level and we will start a south crosscut to connect with this raise in a few days.

Jackson District.

PROSPECTORS.—*Silver State*, Feb. 10: E. M. Le Barron and Charles Bernard are in from Jackson district. Work is progressing steadily on the Pennsylvania mill and mine. There are 35 men in the district, all at work. The Pennsylvania looks well, and is yielding considerable ore. There are several prospectors in the mountains, and new strikes are reported every little while. A mineral deposit has been discovered within a half mile of the mill, which resembles the Silver Reef ore in Utah. The formation is slate and sandstone, and the ore resembles what miners call black metal. Blocks of ore weighing over a hundred pounds each have been quarried out near the grass roots, but there is some doubt as to its value. The ores are different in every vein discovered, and as the district is comparatively new, miners and prospectors do not yet know their value.

Lovelock District.

NICKEL AND COBALT.—*Cor. Silver State*, Feb. 14: Our mines are attracting some attention. The nickel and cobalt mines in Cottonwood canyon have been bonded by an English company who mean business, and will thoroughly prospect them. Bernice is again producing bullion and making regular shipments, which in the last three weeks have aggregated over \$9000. The Bothwell mill is running steadily on custom ores, the price of milling having been reduced to 35 per ton. An important strike has been made in the Hoyt mine, which shows a two-foot vein of rich ore. W. W. Williams is running a tunnel to tap the lead in his mine at a considerable depth, and important developments are expected when the vein is reached.

Peavine District.

THE PLACERS.—*Reno Gazette*, Feb. 10: The claim being worked by Chamberlain and Kinkadee is the old Lingle mine, in Lingle canyon, where O'Neil, Lingle and Kinkadee used to mine. Their last run was made six years ago, when they received \$1,800 apiece as their share. Lingle is said to have made \$9,000 out of the claim himself. After they quit the claim McLain and Bob Hoy got hold of it, and Ollie Perry, the present owner, bought it of them. Chamberlain and Kinkadee leased it of him for a percentage of the net profits. The claim is heavy with iron and most of the gravel is full of black fragments of wash, and every pan shows gold. The iron cap from which the drift seems to come is exposed on the side of the canyon opposite Chamberlain's cabin, and it has tempted O'burn, Shoemaker and Ed. Dalton to do some work in the hope of uncovering the ledge where all the gold comes from. They have only got in a few feet, but they get plenty of rich dirt, and yesterday struck a clay wall which may cover a ledge. D. Harlan and Dalton are pushing the work and feel very confident. Frank Cook and Norton are up on the mountain gathering up the threads of water and turning them all down Lingle Canyon. They have 20 inches of water flow, and think that with Bob Hunter, Golden Preece and Peavine Canyon they will have a hundred inches for several weeks. They have a fall of 80 feet, and from their ditch have laid 520 feet of six-inch pipe. They have 75 feet of canvas with copper pipe to connect the nozzle. They have two nozzles, one an inch and the other one and one-quarter inch. The sluice boxes will run down 120 feet. They are 14x16 inches, and ripples 2x3 inches. There is plenty of pay dirt, as every pan Chamberlain has tried shows from a color to a bit's worth of gold. At Dutch Flat five cents to the cubic yard of gravel pays big, and if the water holds out here the banks will pay well. In fact, gold can be found anywhere along the north flank of Peavine for five miles. Lingle canyon is a narrow gulch leading up between low sage-covered hills, rising rapidly up to the mountain. The pay dirt right where Chamberlain is operating is only a few feet thick, and lies on a bed of yellow clay, which is barren and below which there is nothing. Lingle ran a tunnel into the hill 90 or 100 feet, but it showed nothing. Jersey McDonald and Harry Clark have taken up the claim next below, and are ground sluicing it.

Pioche District.

REDUCTION WORKS.—The Bullionville Smelting Company's reduction works, which have been in the course of construction for the past four months, were completed on Monday, and a start made. The works include a large Steinfeldt furnace, two revolving roasters, a leaching plant of ten redwood tubs, and a furnace for melting the sulphides. The works are the most perfect of the kind on the coast, and reflect much credit on mechanics Grant, Morris, Stevens, Rich and Murdock. The estimated cost of these works is \$100,000. The company intend to work after a little, about 100 tons of tailings in twenty-four hours, at which rate it will take them some four years to clean up at Bullionville and Dry Valley, but as they intend to work custom ores in conjunction with

the tailings, Bullionville is destined to be quite a place for many years to come.

A CHANGE FOR THE BETTER.—*Pioche Record*, Feb. 10: Tales in regard to the resumption of work in Raymond & Ely and Meadow Valley mines have gone forth, and letters are pouring in from ex-Piochers abroad, making inquiries about matters. The facts are simply this: There is a company formed for the purpose of taking hold and operating mining property here, but they will have nothing to do with any property that they cannot obtain a clear title to. They want no trouble on their hands after they pay for and take charge of the property. As to things booming again in Pioche soon, we have our doubts, but we expect a change for the better to take place the coming summer, that will make times better in old Pioche than they have been for several years.

Rebel Creek District.

LOOKING WELL.—*Silver State*, Feb. 13: J. McGrath, superintendent of the Wild Deer mine, at Willow Creek, is in town, on his way to San Francisco. He says the lead is looking well, with thousands of tons of ore in sight, between the 100 and 200 foot levels, that will average \$40 to the ton in gold and silver. The mill, a five-stamp one, is running, and all the ore worked to date averaged \$7 in gold and \$45 in silver. The Ohio mine, in the same district, is producing very rich ore, and a new body of considerable extent has recently been cut in the mine. The Great West, a gold bearing lead, owned by H. H. McColey, has been leased to James Wilson, who is now taking out ore in which free gold is visible to the naked eye. Andy Shrewsbury is working on his gold lead, and frequently finds ore that is worth over one dollar a pound. Mr. McGrath has a lot of specimens from the Wild Deer, in which gold is visible, and which assay from \$300 to \$1000 in silver.

Taylor District.

HOISTING WORKS FOR THE ARGUS.—*White Pine News*, Feb. 12th: Two wagon loads of the machinery recently purchased by Mr. Underhill at Pioche, consisting of boiler, reel and wire cable, arrived in town yesterday. They will be put in place as soon as the work can be done as they are much needed, and will no doubt save much hard labor now being done by man-power at the mines.

A WRONG IMPRESSION.—Many of our State exchanges, and some outside of the State, are giving Taylor a big boost just now, which seems to be attracting a good many people to this place in quest of employment or business, mostly the latter. We wish we could join our neighbors of the press in these rosy views of our town and district, but our regard for the truth will not permit us. That Taylor has and is, and will continue to be, a bullion producer on a scale more than commensurate with the capital employed, is very true. But that capital is not large, nor is it likely to be increased to any great extent by the recent sale of the Monitor property. If a change for the better has been made by the recent purchase it is not yet apparent here, nor is it likely to be felt before mid-summer. Strangers are daily arriving in our town, no doubt being lured hither by the unreliable statements of the outside press. There are now here from 25 to 30 men, mostly old employees of the Monitor and Argus companies, out of work, who will, of course, in most cases, be given the preference to new men, when the force is needed in our mines. In view of these facts, it is almost wicked in our exchanges to publish such articles as are calculated to lure more workmen to Taylor. They are not needed here; there is no work for them, and they will be disappointed if they come.

ARIZONA.

CHLORIDE.—*Mohave Miner*, Feb. 9: The old and well-known mining camp of Chloride, about five miles north of Mineral Park, seems to be indulging in a quiet little boom of its own. Although it makes no pretensions to being a lively camp, still considerable work is being done on the mines in and around it, and there are more men employed in them than one would suppose. This may be said with equal truth of many other mining camps in our county. The Tuckahoe is a good claim, on which a considerable amount of work has been done in former years. On the Independence, Charley Sherman has three men constantly at work, and is still taking out the usual quantities of the rich ore for which this mine has become noted. Mr. Sherman's last shipment netted him over \$400 per ton. The old Crow is a new location which is being worked by Chas. Richardson. He is running a tunnel on the ledge, and is now in about 30 feet, and has a good streak of 100 ounces ore right along. The Connor is one of the mines owned by the Arizona Northern Mining Co., and is now being worked under the management of Mr. John Barry, the superintendent of the company. He has about six men stopping and drifting. The mine is yielding ore that runs from 100 to 150 ounces. The Sunlight is another good claim owned by Mr. Barry, on which the work of development is now going on night and day. The ore from this mine is rich in native silver. The Empire is one of the oldest mines in the neighborhood of Chloride, and has always been considered one of the best. It has been lying idle for some four or five years, but is now being worked by the Oliver Bros., under a lease. They have been working about a month, and a few days ago made their first shipment of ore which sampled about 400 ounces to the ton. The Altata is being worked by Johnny Goshorn, who is stopping out a nice bunch of ore which samples about 160 ounces. The Diana is the special pride of James Cadden, who has spent many a long day in opening it up in good shape. There are few claims about Chloride on which more work has been done than on the Diana. In this mine the ore streak is large but low grade. The Schenectady is a lead mine carrying about 75 ounces in silver and from 30 to 40 per cent lead, and owned by the Benson Smelting Company. It is now being worked by Mr. Brakeman under a lease. The Pearl is another late find which is being worked by Messrs. Mendes and Hallaway, who are getting assays as high as \$900 from it. There are many other claims being worked in this vicinity, notably one near the Connor, owned by H. S. Carpenter, on which Michael Labrosse has a nice little streak of \$800 ore, but lack of space prevents a more extended description at the present time.

RAMBOZ CAMP.—*Cor. Silver Belt*, Feb. 9: The Comet Silver mine, formerly the Miami, owned by

J. B. Henry, F. F. Burke and E. L. Winterberger, is located about half a mile south of this camp. It shows considerable surface work, which was mainly done by the Miami Company, but with the exception of an incline sunk to the depth of 75 feet, the work done scarcely deserves to be classed as development work. Notwithstanding this the company gouged out ore enough to net them \$16,000. Besides this the present owners have taken out sufficient ore to increase the output to date to over \$20,000, to say nothing about 150 tons of low-grade ore yet on the dump, that will work from 35 to 50 ounces of silver per ton, which I consider a creditable showing for a little surface scratching. The general character of the ore is a copper silver glance, carrying some native and chloride of silver, some of which remains in sight in the mine. The J. Gould mine, originally the Ramboz, owned by W. V. Kingsbury, is located parallel to and adjoins the Comet on the west. The main shaft is down 80 feet; besides this there are various open cuts and tunnels at different places on the ledge, all of which show a well-defined vein from three to four feet wide, which is traceable by the croppings the entire length of the claim, 1500 feet. This mine has produced so far 160 tons of ore that averaged at the mill nearly \$200 in silver per ton, and there is on the dumps at the present time about 150 tons of second-class ore, that will yield from 40 to 50 ounces of silver per ton. The ore found here is grey carbonate of lead, carrying chloride of silver. The Rescue mine, owned by L. J. Webster, is situated west and parallel to the J. Gould. The main shaft on this claim is down 100 feet, having many other shallow openings, nearly all of which expose a splendid vein from two to four feet wide. This claim has returned to the owner about \$30,000, and there is at present on the dumps about 200 tons of low-grade ore that will yield from 50 to 60 ounces of silver per ton. The character of the ore is silver glance and sulphides with a small per cent of chloride.

COLORADO.

AT LEADVILLE.—*Denver Tribune-Republican*, Feb. 11: It is gratifying to note that the Robinson mine is again a heavy shipper, and has once more declared a dividend of \$10,000, payable on March 1. The Argo works of this city has a contract for Robinson ore, calling for about 6,000 tons. Steady work and economical management are gradually bringing these so-called played out mines back to a profitable status. Most of all the once famous mines at Leadville that were deemed exhausted of ore are again in pay with favorable chances of encountering other heavy deposits of pay mineral. A great deal of prospect work is now being done to encounter continuations of old ore chutes, or for the discovery of new ones, and this year will witness some important developments from this class of operations. In fact, in all parts of the State miners are thoroughly prospecting and are enthusiastic over the promise of striking ore bodies that have been untouched simply because they had no surface outcrop. Miners in reality are studying underground indications instead of surface indications as formerly, and this new departure has already resulted most beneficially to them. The fact that one ore chute is exhausted is not so discouraging a feature as heretofore, since knowledge has been gained where to look with a reasonable degree of certainty for fresh deposits of like character. The present year will not show the usual number of new mining camps, but more important discoveries will be chronicled. The *Silver Record* of Gothic under the head of editorial correspondence, says: Leadville is again taking its place as the boss mining camp in the world. At the present time there is more work being done around Leadville than ever before. Where one year ago there was one property being worked now there are four; where, last spring, whole streets were nearly depopulated, now every little house is occupied with families, and with all this increase of population there are less idle men than ever before. In fact, miners do not now have to look for a job, for there are not enough miners to fill the demand.

DRILL AND HAMMER.—*Eler Mt. Pilot*, Feb. 12: At the Sylvanite mine Mr. Fore is still running the drift on the vein from the bottom of the shaft. The shaft is about 150 feet deep from the tunnel level, and from the surface something over 300 feet deep. The drift from the bottom of the shaft is over 150 feet long. The company only have about fourteen men employed now, but if they carry out the plans talked of next summer, they will employ a much larger force. There has been a sale pending on the Black Queen mine for some time. This property is situated on Sheep mountain, on Rock creek, and has taken the lead as a producing mine on that mountain, probably because it is further advanced in development. The character of the ore is ruby, black sulphurets and native silver in decomposed black lime, between well-defined walls. The Bullion King mine, in the Ruby district, is working over 20 men at present and is looking remarkably well. Mr. Ropell is still drifting on the other vein from the lower level, and finds the vein as good as expected from that depth. The Forest Queen mine, at Irwin, is now producing more ore, and has larger reserves in sight than at any time for three years past.

IDAHO.

THE IDA MAY.—*Wood River Times*, Feb. 12: Jack Galbraith, who has just visited the Ida May mine, on Lookout Mountain, which is principally owned by H. R. Plughoff of this city, says that the property is a very promising one indeed. The ore-vein is 10 to 12 inches wide, of "solid truck" that assays from 300 to 400 ounces per ton, the ledge is strong, regular, and shows a nearly uniform width the full length of 40-odd feet exposed by the drift. The workings are about 125 feet deep. A car-load of ore is on the dump ready to ship, and as much more can be extracted when wanted without stopping. In fact, the workmen will have to extract no considerable quantity in drifting.

NEW MEXICO.

STRIKE.—*Socorro Bulletin*, Feb. 12: James Stephens has made a rich strike on the summit of the Magdalena mountains, and has named his claim after the advanced liberal Joseph Cowen. He showed us a sample of some of the finest ore we have ever seen from this district, and if the lead holds out he has certainly struck it rich. It is rumored that the rich placers and gold quartz veins in

the Corrillos district will very soon again be worked, and the rich deposits will once more hum with busy human life. The president of the New Mexico Mining Company, which owns the Ortiz mountain and the placers, has arrived in Santa Fe, and great things are expected from the more rational and liberal policy which the company seems disposed to adopt in its relations with the miners. We can only hope that these rumors have solid foundation. The old placers are one of the richest, if not the richest, gold fields in America now remaining unworked. There is no prospecting to be done; its riches are known, and it is quite time that legal difficulties should be adjusted and the mining community be allowed to have an innings.

OREGON.

PLACER AND QUARTZ.—*Jacksonville Times*, Feb. 12: Although none of the miners have cleaned up, considerable gold-dust is finding its way to Beekman's banking house already. The rains of the past week have been very acceptable to the miners, as the water supply had commenced to diminish in some districts. Geo. Cardwell has located to quartz mine in the Sterling district, that seems to be quite extensive, and the ore from which assays well. Work on the site of the proposed quartz mill in this place is progressing rapidly, and the building will be ready for the machinery before long. Turner & Johnson have run a crosscut to tap the Rising Sun ledge, and a large body of ore has been exposed, a test of which is being made. John Blalock and Geo. Owings of Evans creek are prospecting at the head of Jackson creek, and have found some promising quartz and placer prospects. When good weather comes much prospecting will be done. The mineral resources of this country have never received half the attention they merit. The machinery for the quartz mill at this place has been shipped and will soon arrive. The crushing of quartz will no doubt commence in the near future. Frank Legg and John McDonnell are very busy at their hydraulic claim on Jackson creek and have every prospect of a profitable run. They have one of the richest claims in Jackson county. Quite a number of prospectors are at work in the Applegate district, some of whom report excellent prospects. Anderson & Walker have a presumably extensive ledge, which assays as high as \$90 to the ton. Capt. Saltmarsh was in town this week, from whom we learned that his company has plenty of water once more and is making the most of it. They have rich diggings, but have not had enough water for several seasons past to work them. M. D. Hopkins of Grave Creek, who is in town, informs us that the miners of that section have an abundance of water and the prospects are favorable for the best cleanup in several years. Considerable prospecting is also being done there.

PINE CREEK NOTES.—*Cor. Bedrock Democrat*, Feb. 9: The weather at present is fine, but for the past three weeks, with the exception of three days, it has been very stormy. The snow is now five feet deep, but the roads are open. Building is now at a standstill, owing to a scarcity of lumber, but it would be almost impossible to get a mill in and saw any lumber before the first of May, if that soon, for the roads in the spring are very bad until June or later. The Oregon Gold Mining company are driving work ahead at their mine, as fast as money, muscle and brain will do it. Their two-compartment shaft is down over 50 feet, and is finely timbered, strong enough to last for a century. For the past four days their road has been blocked so that it was impossible for teams to get through, but it is now shoveled out. To clear the road it was necessary to make a cut 15 feet deep and 8 feet wide through a snow slide. The snow is 7 feet deep in the road, but it is solid enough to hold up the teams, and as this is the only way of getting timbers to the mines, the company will probably be better prepared before next winter. The company will commence the erection of their large stamp mill as soon as sufficient lumber can be obtained for the purpose.

Jas. McDonough is mining at his placer diggings, near Fort Lane, and has already picked up several fine specimens of quartz, which are full of gold. Evidently, a very rich ledge exists in the immediate vicinity. Deselles & Connell, of Scotch gulch, Josephine county, who own one of the best and most regularly paying mines in the State, will, no doubt, do better than ever, as a much more extended season is assured. Keaton & Klippel, McKee & Co., and several other hydraulic miners in the Foreman's and Forest creek districts are working day and night, with full heads of water and good prospects. All the others are also busy.

UTAH.

REVIEW.—*Salt Lake Tribune*, Feb. 5: The great event of the week in mining circles was the starting up on Tuesday morning of the renovated and reconstructed Marsac mill, at Park City, Utah, on Daly ore, by the Daly company. The full thirty stamps are now running, and this "second Ontario" may be depended upon to begin shipments of bullion the course of a week or so that will be steady and strong. For the month of January the receipts of silver and base bullion amounted to \$328,822.66. This is exclusive of ores either received or shipped. The receipts of bullion and ore in this city for the week ending February 27, inclusive, were as follows: Bullion, \$24,707.27; ore, \$54,950; total, \$139,657.27. For the previous week the total receipts were \$132,406.55, of which \$78,936.55 was bullion and \$53,470 was ore. It will be observed that the ore receipts for the past fortnight have been remarkably heavy, indicating a better market here for ores than heretofore. At the same time the ore shipments away from here have fallen off in a corresponding degree. The shipment of five cars of Horn Silver ore does not appear to have been followed by others, and though there has undoubtedly been ore trapped in the mine, nothing can be learned of the extent or richness of the body. During the week base bullion to the value of \$10,990 and fine bars valued at \$31,600 were received in this city, besides specific products named herein. The Stormont sent up silver bars valued at \$4,000. Stormont stock, 1000 shares, sold in New York on the 23d ult. at 15c. The Hanauer smelter produced during the week four cars of bullion, 12,590; the Germania, five cars, \$12,737.27. Ore receipts for the week were—miscellaneous, \$18,250; silver and lead ores, \$30,000; silver ores, \$6,700; total, \$54,950.

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Nos. 2 and 4 California Street, San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

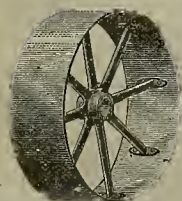
J. A. Fay & Co.'s Woodworking Machinery.	Williamson Bros' Hoisting Engines.
Frank & Co.'s Woodworking Machinery.	Atlas Engine Works Engines and Boilers.
New Haven M'fg Co.'s Machinists' Tools.	Payne's Vertical and Horizontal Engines.
Bement & Son's Machinists' Tools.	Otto Silent Gas Engines.
Bickford's Power Drills.	Clapp & Jones' Steam Fire Engines.
Blake's Improved Steam Pumps.	Pickering Engine Governors.
Perry's Centrifugal Pumps.	Judson Engine Governors.
Perin Band Saw Blades.	Tanite Co.'s Emery Wheels and Machinery.
Sturtevant Blowers and Exhausts.	Nathan and Dreyfus Oilers.
Shimer Matcher Heads.	Korting Injectors and Ejectors.
Brainard Milling Machines.	Disston's Circular Saws.
Turbine Water Wheels.	New York Belting and Packing Company's
Bradley Cushioned Hammers.	Rubber Goods.
Massey's Steam Hammers.	Lane and Bodley Saw mills.
Schlenker's Bolt Cutters.	H. W. Johns' Asbestos Packing, Paint, etc.
Holloway Fire Extinguishers.	

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

Chicago Prices Beaten!
ESTABLISHED 1860.
S. F. PIONEER SCREEN WORKS,
221 & 223 First St., cor. Tebama, S. F.
J. W. QUICK, Prop'r.
Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Meat Driers, Furnaces, Churns, Cement and Shunt Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).
Orders Promptly Executed



PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

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Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
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SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

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CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and

HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street

San Francisco, Cal.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

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THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.



JENKINS PATENT VALVES.

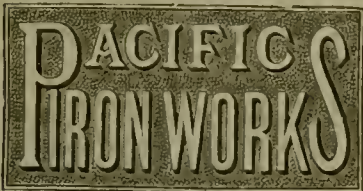
Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take the nut off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.



1850. 1885.
RANKIN, BRAYTON & CO.,
... BUILDERS OF ...
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, crushing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

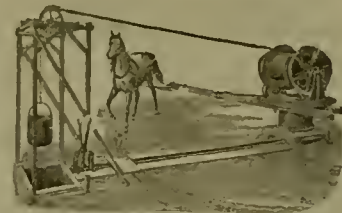
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



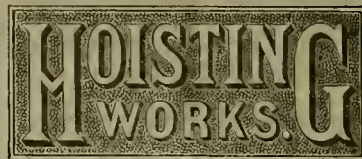
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE of OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE BEING SUFFICIENT to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an ANALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 600 feet of five-eighths steel rope. SEND FOR CIRCULAR.



SEND FOR CIRCULAR.

IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. Referencee first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

SAN FRANCISCO GOLD, SILVER AND NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.
E. G. DENNISTON, Proprietor.

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

STURTEVANT MILL.

This Mill as a Crusher and Pulverizer is without rival. Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

Huntington Centrifugal QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,
JIGS and TROMMELS

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:
Fulton and Union Streets, Chicago, Ill.
NEW YORK OFFICE:
Room 4S, No. 2 Wall Street.

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No. 243 Eighteenth Street, Denver, Colorado.
MEXICO OFFICE:
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CHILLED CAR WHEELS.

Medal Awarded. Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 First Street, SAN FRANCISCO, CAL.
IRON CASTINGS OF ALL DESCRIPTIONS.

THE GLOBE IRON WORKS CO.

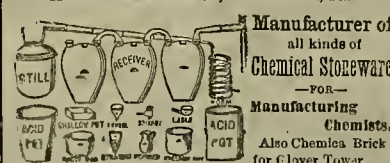
Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AGTS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,
1100 East Cumberland St., PHILADELPHIA, PA.



San Francisco Cordage Factory.

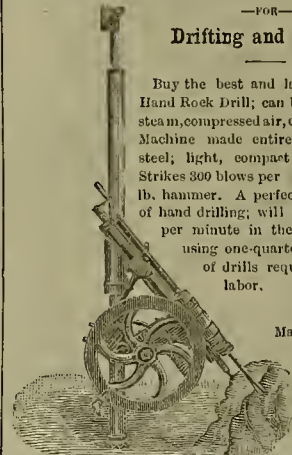
Established 1853.
Constantly on hand a full assortment of Manila Rope
Sisal Rope, Tarred Manila Rope, Hay Rope, White
Line, etc., etc.
Extra sizes and lengths made to order on short notice.

TUBBS & CO.
611 and 613 Front St., San Francisco.

CALIFORNIA HAND ROCK DRILL

—FOR—
Drifting and Sinking.

Buy the best and latest improved Hand Rock Drill; can be run by hand, steam, compressed air, or water power. Machine made entirely of crucible steel; light, compact and durable. Strikes 300 blows per minute with 7-lb. hammer. A perfect reproduction of hand drilling; will drill one inch per minute in the hardest rock, using one-quarter the number of drills required by hand labor.



Machines on exhibition at No. 32 First St., San Francisco.

Send for circulars.

C. O. BARLOW, General Manager.

MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

... MANUFACTURER OF ...

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.
Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

THE RUSSELL PROCESS COMPY.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY,
Room 709.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co.	Nevada.	23.	25.	Feb 16.	Mar 23.	Apr 13.	B. Burris	309 Montgomery St
Alka S M Co.	Nevada.	33.	25.	Feb 1.	Mar 5.	Mar 25.	W H Watson	302 Montgomery St
Benton Con M Co	Nevada.	15.	10.	Feb 4.	Mar 11.	Mar 30.	W H Watson	302 Montgomery St
Best & Becher M Co.	Nevada.	33.	59.	Jan 6.	Feb 10.	Mar 9.	W Willis	309 Montgomery St
Belcher Con M Co.	California.	3.	30.	Dec 23.	Jan 25.	Feb 27.	J Connor	501 Sansone St
Buchanan M Co.	California.	15.	25.	Feb 9.	Mar 17.	Apr 5.	T J Sullivan	121 Post St
Chollar M Co.	Nevada.	19.	50.	Dec 30.	Feb 17.	Feb 25.	C E Elliott	309 Montgomery St
Forty-nine M Co.	California.	1.	10.	Feb 4.	Mar 15.	Apr 5.	A L Perkins	310 Pine St
Johnson M Co.	California.	3.	02.	Feb 3.	Mar 8.	Apr 6.	G White	318 Montgomery St
Lady Washington Con M Co.	Nevada.	5.	05.	Feb 4.	Mar 9.	Mar 29.	W H Watson	302 Montgomery St
Merican M Co.	Nevada.	31.	25.	Feb 9.	Mar 15.	Apr 8.	C E Elliott	309 Montgomery St
Navajo M Co.	Nevada.	11.	30.	Jan 9.	Feb 15.	Mar 8.	J W Pew	310 Pine St
Potosi M Co.	Nevada.	22.	30.	Feb 4.	Mar 9.	Mar 31.	C E Elliott	309 Montgomery St
Peerless M Co.	Arizona.	6.	20.	Jan 11.	Feb 12.	Mar 2.	A Waterman	309 Montgomery St
Peer M Co.	Arizona.	4.	10.	Jan 11.	Feb 15.	Mar 6.	A Waterman	309 Montgomery St
Savage M Co.	Nevada.	35.	50.	Jan 4.	Feb 9.	Mar 1.	E B Holmes	309 Montgomery St
Sierra Nevada M Co.	Nevada.	34.	25.	Jan 5.	Feb 9.	Mar 1.	E L Parker	309 Montgomery St
Union Con M Co.	Nevada.	32.	25.	Jan 11.	Feb 15.	Mar 8.	J M Buffington	309 California St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Lowa M. Co.	California.	C. C. Leavitt.	510 Battery St.	Annual.	Feb 23

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Caledonia M. Co.	Nevada.	W. L. Oliver.	323 Montgomery St.	10.	Feb 23
Con. Virginia & C. Co.	Nevada.	A. W. Havens.	309 Montgomery St.	30.	Feb 12
Derbec Blue Gravel M. Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Feb 9
Holmes M. Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Feb 21
Jackson M. Co.	California.	D. C. Bates.	10.	Oct 5	
California S. M. Co.	Nevada.	John C. Davis.	419 California St.	25.	Feb 17
Silver King M. Co.	Arizona.	J. Nash.	325 Montgomery St.	25.	Feb 15
Syndicate M. Co.	Nevada.	J. Stadfeld Jr.	419 California St.	10.	Dec 21

Mining Share Market.

There is no special feature to record of the mining stock market. On the Comstock development work progresses as usual, and assessments continue to be levied as in times past. The pumping out of the Osborn shaft of the Gould and Curry and Best and Belcher mining companies, goes steadily ahead, and it is merely a matter of time when the water will all be out and the sinking of the shaft resumed to sink to a depth corresponding with the 3,200 level of the Combination shaft and middle mines.

Meanwhile the deep winze of the Hale and Norcross mine has already reached the 3,200 level and about 25 feet below it, for a sum or shaft drain.

One extraction is resumed above the 3,000 level of Hale and Norcross, and something interesting is hinted at in that line and direction before long.

Bullion Shipments.

Barber's mill, Feb. 13, \$3,000; Odessa mill, 13, \$11,000; Oro Grande mill, 13, \$4,283; Argus, 13, \$9,046; Ootario, 7, \$25,567—for January, \$111,792; Germania, 9, \$29,331; Hanauer, 9, \$3,100; Alice, 9, \$74,058; Germania, 10, \$28,241; Hanauer, 11, \$3,200; Germania, 12, \$3,068; Hanauer, 16, \$3,350; Alice, 13, \$16,557; Germania, 13, \$3,262; Stormont, 14, \$3,700; Hanauer, 14, \$4,700; Germania, 14, \$4,700; Germania, 14, \$3,276. The banks of the city report the receipt for the week ending February 10th, inclusive, of \$70,281.22 in bullion, and \$51,736 in ore; a total of \$122,017.22.

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Feb. 18, 1886.

ANTIMONY—Per pound.	12 @	—
Hall's.	12 @	—
Cookson's.	13 @	—
BORAX—Refined.	53 @	74
IRON—Glenbrook ton.	23 @	00
Eglington, ton.	22 @	00
American Soft, ton.	24 @	00
Oregon Pig, ton.	—	—
Clippage Gap, Nos. 1 & 4.	22 @	23 50
Clay Lane White.	24 @	00
Sticks, No. 1.	24 @	00
STEEL—English, lb.	16 @	25
Black Diamond, ordinary sizes.	13 @	—
Plow.	—	5
Machinery.	8 @	10
Sanderson Bros.	13 @	—
COPPER—		
Braziers sizes.	20 @	22
Fire-boxes.	20 @	—
Boil.	20 @	—
Yellow metal.	12 @	13
Ingot.	12 @	13
LEAD—Pig.	4 @	40
Pipe.	7 @	—
Sheet.	8 @	—
Shot, discount 10% on 500 bag.	Drop, @ bag.	1 85 @
Buck, @ bag.	2 @	05
Chilled, do.	2 @	25
Sheet, 12 1/2 ft. by 10 ft. less case.	7 @	—
QUICKSILVER—By the flask.	33 @	—
Flasks, new.	1 @	05
Flasks, old.	85 @	—
TINPLATE—Coke, lb.	15 @	5 40
Charcoal.	15 @	6 25
NEW YORK PRICES—		
California Borax.	73 @	74
Pig Iron, American.	16 @	43 50
Quicksilver.	43 @	43 50
Australian Tin.	20 @	95 @ 21 05
Bar Silver.	1 @	02 1/2 @
Lead.	4 @	45 @
Copper.	25 @	11 37 1/2
Refined Silver (per cent discount).	20 @	21 1/2

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

THE reliable optician, C. Muller, 135 Montgomery St., near Bush, opp. Occidental.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 23.	WEEK ENDING Feb. 4.	WEEK ENDING Feb. 11.	WEEK ENDING Feb. 18.
Alpha.	50	30	30	35
Alta.	25	10	10	15
Andes.	15	15	15	10
Argenta.	100	100	100	100
Belcher.	1.00	1.00	1.00	1.10
Balding.	50	50	50	50
Best & Belcher.	20	20	20	20
Bullion.	25	30	25	25
Bonanza King.	15	15	15	15
Belle Isle.	15	15	15	15
Benton.	1.65	1.75	1.80	1.85
Bodie.	65	65	65	65
Bodie Tunnel.	10	10	10	10
Bulwer.	40	45	50	45
California.	2.00	2.10	2.00	2.70
Challenge.	15	15	15	15
Champion.	35	45	50	50
Chollar.	35	45	50	50
Confidence.	90	90	95	90
Con. Imperial.	2.10	2.30	2.25	2.70
Con. Virginia.	2.10	2.30	2.25	2.70
Con. Pacific.	45	50	55	55
Crown Point.	70	75	90	130
Day.	2.25	2.20	2.25	1.95
Eureka Con.	2.25	2.20	2.25	1.95
Eureka Tunnel.	2.25	2.20	2.25	1.95
Exchequer.	10	10	10	10
Grand Prize.	10	10	10	10
Gould & Curry.	70	80	65	70
Goldshaw.	2.35	2.50	2.35	2.45
Hale & Norcross.	10.75	10.75	11	11
Holmes.	10.75	10.75	11	11
Independence.	10	10	10	10
Julia.	10	10	10	10
Justice.	10	10	10	10
Martin White.	3.80	4.20	3.90	4.15
Mono.	30	35	30	35
Mexican.	30	35	30	35
M. D. Diablo.	30	35	30	35
Northern Belle.	10	10	10	10
Navajo.	10	10	10	10
North Belle Isle.	10	10	10	10
Occidental.	80	80	80	80
Optim.	15	20	15	15
Potosi.	35	40	40	40
Pinal Con.	60	70	50	60
Savage.	60	70	50	60
Seg. Belcher.	40	45	35	40
Sierra Nevada.	40	45	35	40
Silver Hill.	7.00	7.00	8.00	6.00
Silver King.	7.00	7.00	8.00	6.00
Syndicate.	10	10	10	10
Union Con.	20	15	30	25
Utah.	45	50	60	65
Yellow Jacket.	90	95	90	105

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Feb. 18.	140 Eureka Con.	1.95 @ 2.00
150 Alpha.	250 Exchequer.	20
200 Alta.	100 Gould & Curry.	80c
200 B. & Belcher.	700 Hale & Nor.	2 25
100 Bodie Con.	200 Mexican.	35c
100 Belcher.	100 Mono.	4.00
200 Chollar.	200 Optim.	50c
100 Crown Point.	100 Peerless.	25c
450 Con. Va. & Cal.	50 Union Con.	50c
50 Confidence.	125 Yellow Jacket.	1.00

OFFICE OF THE

Caledonia Gold Mining Company

San Francisco, California.

At a meeting of the Board of Directors of the above-named Company, held February 8, 1886, Dividend No. 4, of Ten Cents (10c) per share, was declared, payable on Tuesday, the 23rd day of February, 1886, at the office of the Company, at Messrs. Laidlaw & Co., Transfer Agents, 14 Wall Street, New York. Transfer books will close on Saturday, February 20, 1886, at 12 o'clock a. m.

W. LETTS OLIVER, Sec'y.

OFFICE—No. 325 Montgomery St., San Francisco, Cal.

TO MINING MEN.

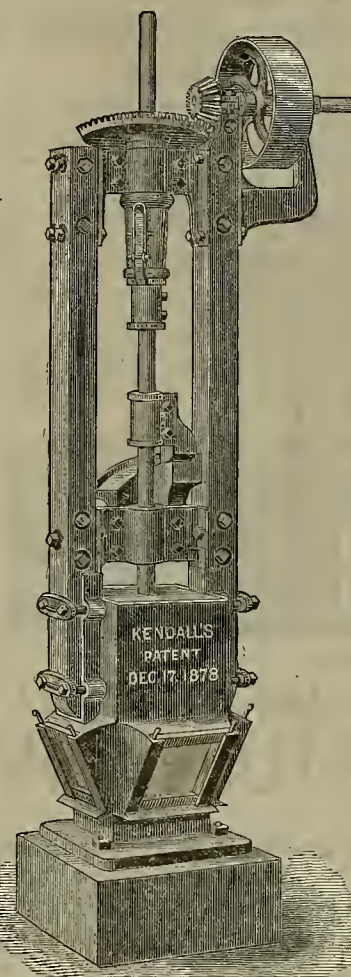
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California Inventors

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DELINQUENT NOTICE.

Pine Tree Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Summit Mining District, Kern County, California.

NOTICE.—There are delinquent upon the following described stock, on account of an assessment (No. 1) levied on the 22d day of December, 1885, the several amounts set opposite the names of the respective shareholders, as follows:

NAMES.	No. Certificate.	No. Shares.	Amount.
Bennet, C.	9	1,000	\$ 150 00
Griswald, A. H.	10	1,000	150 00
Griswald, A. H.	13	1,000	150 00
Griswald, A. H.	14	1,000	150 00
Griswald, A. H.	10	500	75 00
Griswald, A. H.	63	500	75 00
Griswald, A. H.	60	250	37 50
Griswald, A. H.	67	250	37 50
Griswald, Mrs. A. H.	8	1,000	150 00
Griswald, Wm. A. H.	17	500	75 00
Griswald, M.	13	500	75 00
Griswald, Harriet B.	19	500	75 00
Wilson, W. C.	7	20,000	3,000 00
Wilson, W. C.	20	1,000	150 00
Wilson, W. C.	21	1,000	150 00
Wilson, W. C.	22	1,000	150 00
Wilson, W. C.	23	1,000	150 00
Wilson, W. C.	24	1,000	150 00
Wilson, W. C.	25	1,000	150 00
Wilson, W. C.	26	1,000	150 00
Wilson, W. C.	28	500	75 00
Wilson, W. C.	29	500	75 00
Wilson, W. C.	30	500	75 00
Wilson, W. C.	31	100	15 00
Wilson, W. C.	32	100	15 00
Wilson, W. C.	33	100	15 00
Wilson, W. C.	34	100	15 00
Wilson, W. C.	35	100	15 00
Wilson, W. C.	36	100	15 00
Wilson, W. C.	37	100	15 00
Wilson, W. C.	38	100	15 00
Wilson, W. C.	39	100	15 00
Wilson, W. C.	40	100	15 00

And in accordance with law, and an order of the Board of Directors, made on the 22nd day of December, 1885, so many shares of each parcel of stock as may be necessary will be sold at public auction, at the office of the Company, room 4, No. 309 California street, San Francisco, California, on Monday, the 15th day of February, 1886, at the hour of 2 p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. M. BUFFINGTON, Sec'y.
OFFICE—Room 4, No. 309 California St., San Francisco, California.

POSTPONEMENT.

At a meeting of the Directors, held on the 15th day of February, 1886, at one o'clock p. m., it was ordered that the day of sale be postponed to the second day of March, 1886, at the hour of two o'clock p. m. of that day, at the office of the Company, Room 4, 309 California Street, San Francisco, California.

J. M. BUFFINGTON, Secretary.
San Francisco, Feb. 16, 1886.

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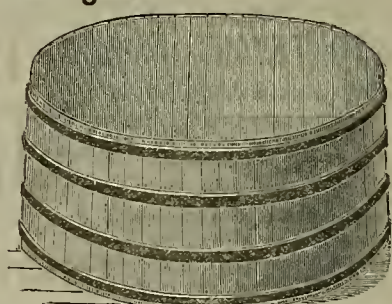
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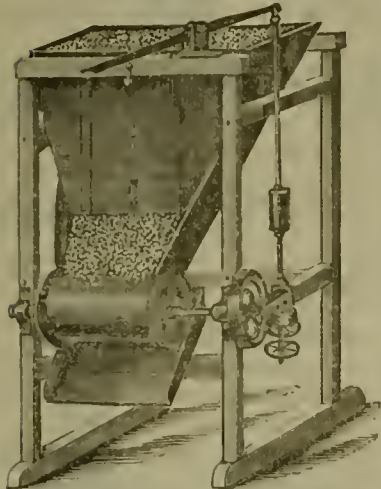
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H. M. NEWHALL & CO.,
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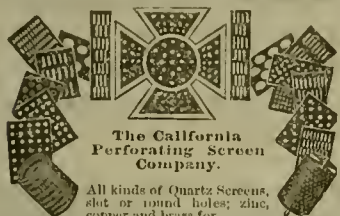
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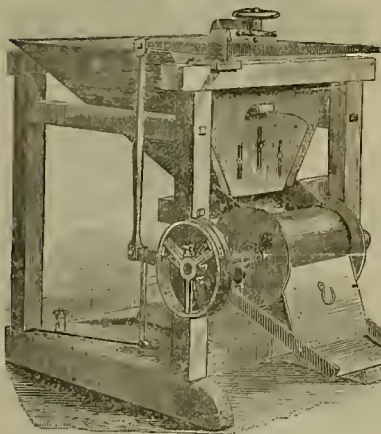
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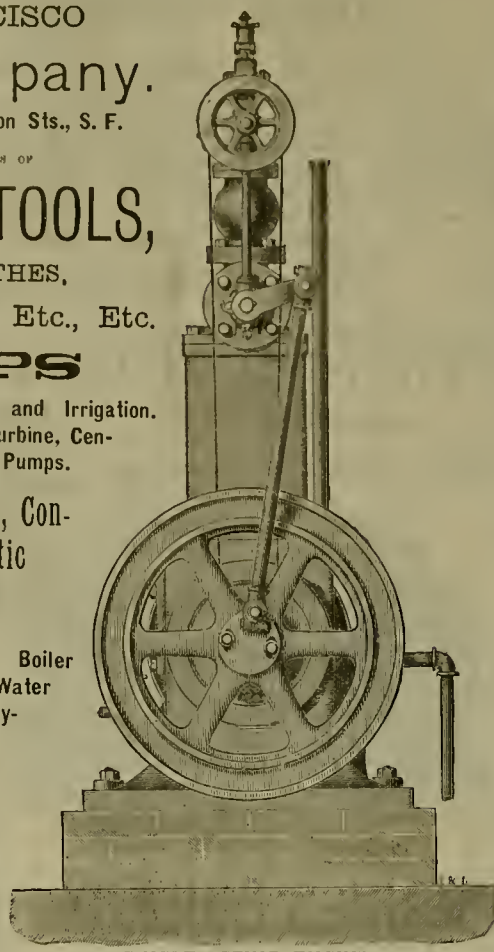
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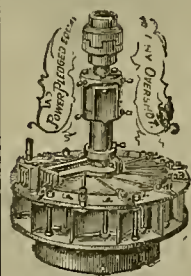
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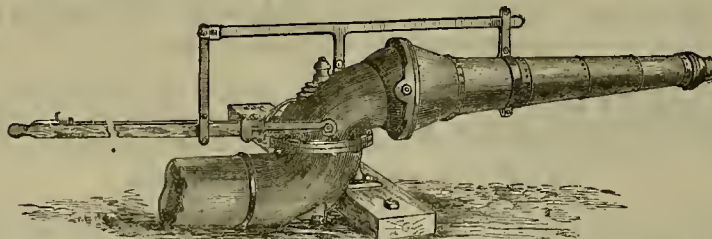
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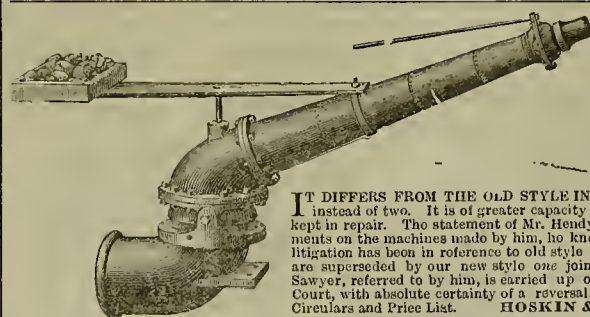


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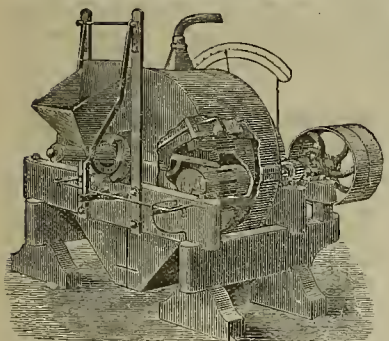
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[From the Engineering & Mining Journal, Aug. 8, 1885.]
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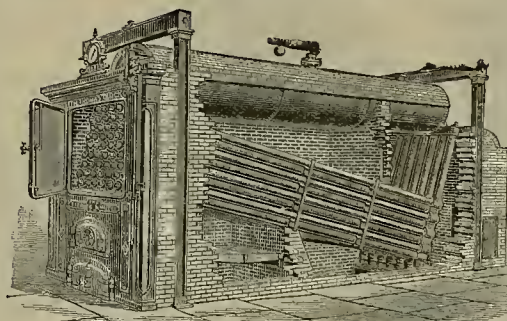
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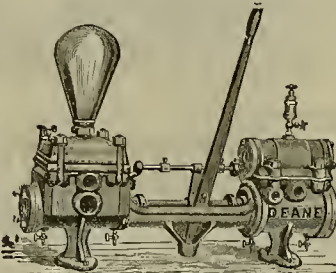
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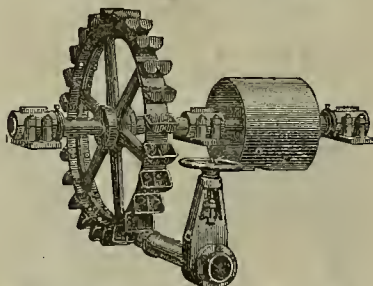
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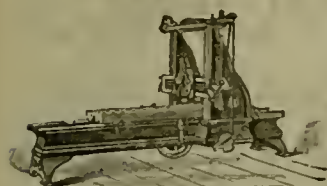


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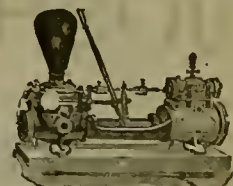
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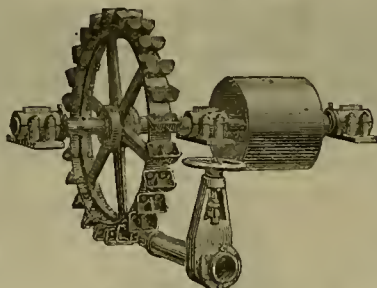
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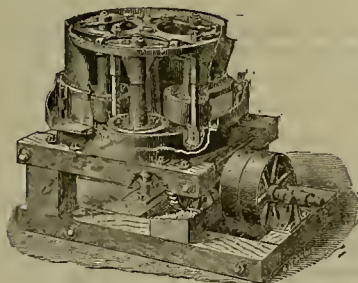
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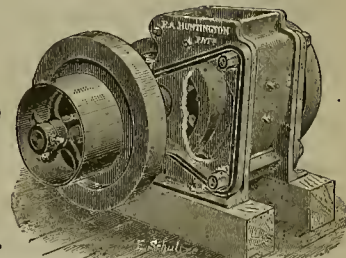
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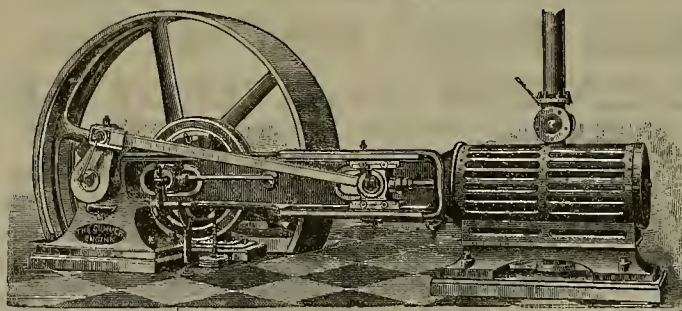
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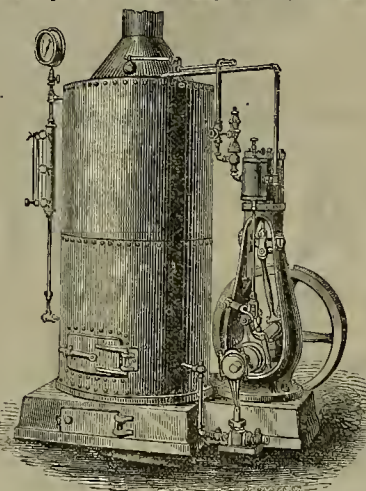
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Stationary, Portable, and Hoisting

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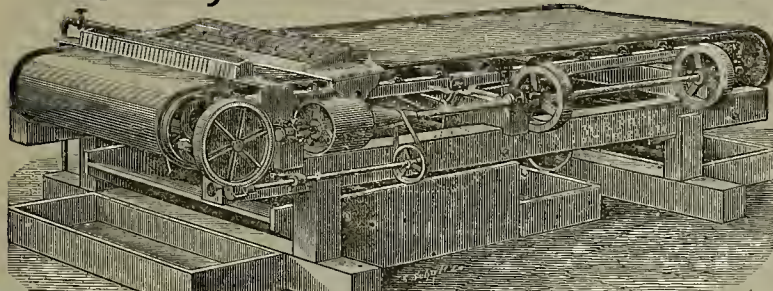
STEEL BOILERS of Two Sheets only, Steel Economic Boilers, combining with the safety, durability and economy of the Stationary Boiler, the conveniences and portability of the Portable. It occupies but little space, and is the best and cheapest boiler ever made.

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As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

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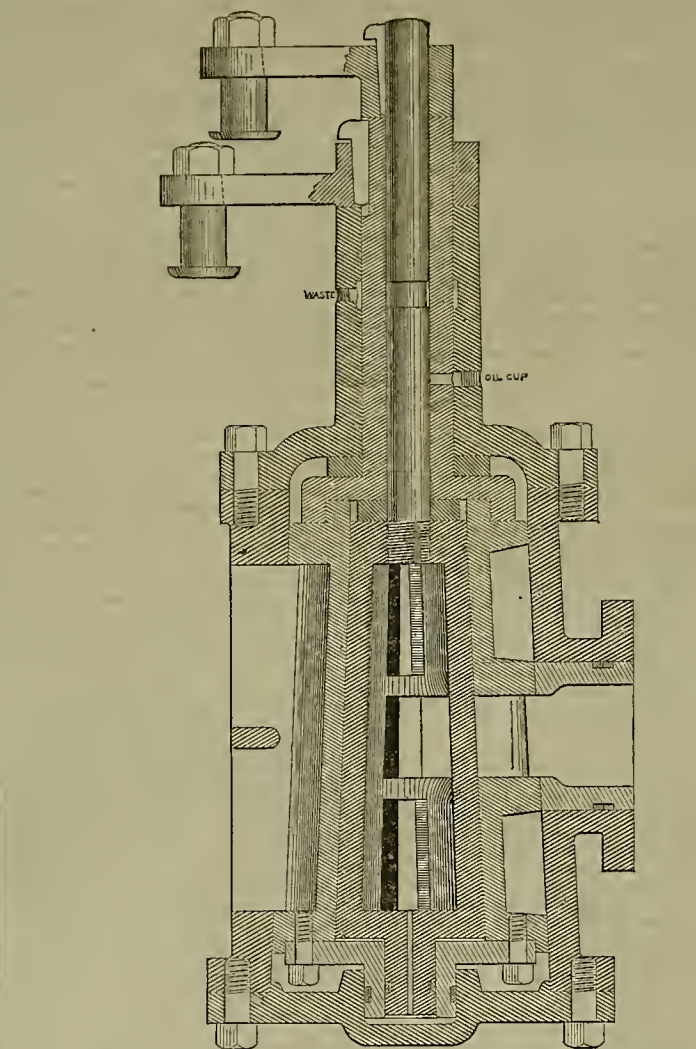
SAN FRANCISCO, SATURDAY, FEBRUARY 27, 1886.

VOLUME LII
Number 9.

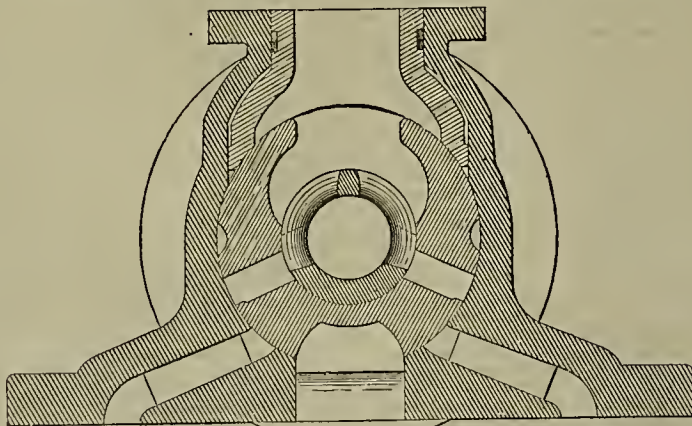
The Assaying Laboratory at Berkeley.

In the mining department of the University of California there is a very complete assaying laboratory. It offers facilities for assaying, by the most improved methods, ores of gold, silver, lead, antimony, tin, iron, nickel, cobalt and quicksilver, as well as fuels, mattes, slags, speiss and bullion. This laboratory occupies two floors of the mining building. The lower floor is devoted to fire assays exclusively. The crushing and sampling room contains a Taylor's hand-crusher, large iron mortars and rubbers, a sink, with bateas and a miner's pan, for washing ores, an assortment of sieves, and a large sampling table. The mixing or fluxing room contains desks with pulp scales and hoxes containing fluxes, a Fairbanks scale, and a hood with gas burners and stands for parting gold and silver. The furnace room contains four crucible furnaces and three muffle furnaces, arranged for burning coke; also, large muffle and crucible furnaces for burning soft coal, like those in use at Freiberg and Przibram. These furnaces have all been carefully designed, are built into the walls, and iron-clad in a substantial manner. The weighing room contains four of Becker's assay balances. A convenient storeroom completes the lower laboratory. On the floor above, a large room, devoted to bullion and volumetric assays, contains a pair of iron-clad muffle furnaces, Hoskins gasoline crucible and muffle furnaces, parting hoods, a galvanic and a thermo-electric battery, a one-horse power petroleum engine, work-benches, tools, and a pair of steel rolls; another, lighted by yellow glass windows, is devoted to the humid or mint assays; a third, for special investigations, contains a gas muffle furnace and one for crucible assays, a water-blast blowpipe, and a distillation apparatus; a fourth, a special balance room, contains the finest Oertling and Becker assay balances. Besides the above, the laboratory is supplied with a very complete equipment for measuring high temperatures, such as an air thermometer, a Fisher calorimeter-pyrometer, and a Sieman's electric pyrometer; also, the Orsat, Bunte and Fisher apparatus, for analysis of furnace gases. All the appliances are of the most approved pattern. The only charges to the student are for materials actually used.

PROGRESS OF ELECTRICITY.—His Majesty, the King of the Belgians, in 1876 instituted an annual prize of twenty-five thousand francs (\$5,000) for the encouragement of intellectual researches. The prize in 1889 will be international and will be granted the author of the best work upon "The progress of electricity in its uses as a motor and for lighting purposes, with all applications that can be made of it, for such purposes, and the economy and advantages which its use may offer." All foreigners desirous of competing will be required to send their works in manuscript or printed before January 1, 1889, to the Minister of Agriculture, Industry and Public Works, Brussels. A new edition of a printed work will be accepted if it presents new features and much greater information than the preceding edition, and the date of publication be not earlier than 1885. The competing work may be written in English, French, Flemish, German, Italian or Spanish, and, if in manuscript, will be required to be published within a year after the granting of the prize.



SECTIONAL VIEW OF OHMEN-SIMMONS VALVE MOTION.



END VIEW OF OHMEN-SIMMONS VALVE.

In the Superior Court of Yuba county last Friday, Pat. Campbell, Joseph Rigby and Ah You were fined \$500 each, and James Devers \$50 for contempt of court, by reason of violating an order of the court which enjoined the Golden Gate mine at Smartsville from hydraulicking. All the fines have been paid.

The Old Dominion mine property at Globe, Arizona, has been sold under execution by the judgment creditor for \$105,000. The whole amount of the sale was \$130,000.

ANTIMONY is selling in Liverpool at £35 to £36 per ton.

The Ohmen-Simmons' Valve Motion.

As will be seen from the engraving, this valve consists of a taper-plug main valve, with a cut-off valve of the same shape inside of it, having an inlet on one side and steam and exhaust ports on the opposite. Both ends of the valves are closed, the larger ends being provided with trunnions. The valve stems are on the smaller end and have on their outer ends, which pass through a sleeve on the valve casing, cranks which are operated by the eccentrics.

To obtain a steam-tight connection between the casing and the main valve, a packing is provided, the upper end of which is let into neck of the steam inlet and the lower side fits the shape of the valve, the packing being held down by pressure of steam. Unseating of valves is obviated by allowing steam to pass through the trunnions into the recess in which they work, the area of the trunnions being sufficient to overcome the tendency of the valves to leave their seats on account of their taper. Collars are placed on the stems to prevent the valves from being forced too far in.

Condensed water is allowed to escape through a recess in the stem of the main valve and sleeve and casing; no packing is required on the stems. By cutting grooves from the exhaust cavity, a free circulation of steam is obtained over the back and ends of the main valve, for the purpose of lubrication and prevention of clogging by oil sediments.

The operation of the main valve is the same as a slide valve, while the cut-off valve regulates the supply of steam from zero to three-quarters' stroke. The cut-off valve is operated by a shaft governor, which is also patented, steam being supplied from the interior of the valves; both are therefore necessarily balanced.

Three years steady running in a flour mill on a 350 horse-power engine in this city, with 90 pounds steam pressure, have proven that there is not the slightest wear to a valve of this kind. It is also running in a number of other places here. The attention of Eastern engine builders is called to this valve, as rights to use it can be secured. This valve motion is equally adapted for high running as well as slow running engines. It is patented by W. H. Ohmen, 22 Fremont St., in this city, who is an engine manufacturer.

Copper.

Copper continues to command a higher price in New York than in Liverpool. The American shipments to England and France in January, 1885, were 4344 tons, whereas in January, 1886, there were only 1595 tons. In fact 150 tons of American matte recently shipped to Liverpool, was reshipped to New York for sale. The difference in American and English estimates of production of this country for the last year is considerable. The American figures show a production of 67,500 tons in 1885 against 63,556 in 1884. James Lewis & Sons' report on ores and metals says these figures, if correct, show that stocks in the United States must have diminished considerably, as the import into England and France in 1885 was 8753 tons larger than in 1884. The United States sent to England last month 1351 tons of copper; Chili sent 1887 tons. The total visible supply of copper, as estimated by the reports referred to is 58,646 tons 6ne. The imports from Chili into Liverpool and Swansea in January were 2174 tons.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Virginia City, Nevada.—No. 4.

The Comstock Lode—Its Immensity and Comparative Wealth—Its Possibilities When Adequately Explored.

[By our Special Correspondent, J. B. P.]

The developments in the past in this bonanza camp have been amply sufficient to reveal the imperfect and haphazard nature of the difficult undertaking from the outset. A block of territory some two miles in width and eight miles in length, filled up with gold and silver lodes, cropping out from every knob, and sharply bisecting every stretch of ravine, is apt to confuse the unpracticed eye, and to afford plenty of speculation even to the most skillful. If ever a philosopher existed this side of the Socratic age, in the study of physical laws, that being may well be represented in the cool, careful and well-balanced thinking miner. From the visible and tangible, he is prone, of necessity, to dwell upon and discuss the invisible and the occult. In comparison, it would be an easy task for one to roll his very convenient tub around, after the manner of the great Diogenes, and speculate upon the uncertain fortunes of men and State; but when, with the most meager data and the feeblest rays of silver light to guide his course, the astute miner is induced to drop his plummet line of exploration more than three thousand feet down into the bosom of the rocky earth, in order to sound for new bonanzas, we have presented a practical faith horn of a philosophic principle that commends itself to the wisest and noblest minds of all ages.

Whilst we speak thus of the true quartz miner as a practical philosopher, we would not by any means, have the reader infer that we purpose to follow up the subject in the same strain and invest the present article concerning this camp with anything that partakes of the dreamy or the speculative. As in our previous contributions, we purpose to offer some practical suggestions, that have forced themselves upon our attention as we have traversed and inspected for ourselves the upper and lower levels, as well as the surface outlines of this wonderful silver mountain. Irrespective of the

Great Revolution now Going on

In the expense of ore reduction, and which appears destined, very soon, to convert ten dollar rock into fabulous bonanza, we shall only shape our remarks upon the basis of previous discoveries, and former workings in these mines. These will be amply sufficient, we believe, to admit a few rays of light upon a topic so intensely absorbing, to the mining operator here, as well as to the interested public abroad. Comprehending a score of years, and such a harvest of mineral wealth, nothing like an equivalent advertisement has ever been given to any similar mining project, in modern times, as was achieved by this camp. With such a prestige, the eye of critical curiosity rests with peculiar force upon the hive of mining industry located here, anxious to learn, at the earliest possible moment, what turn may be given to this consolidated effort of capital and labor.

In Reviewing this Camp

No thought is apt to fasten itself sooner perhaps, upon the reflecting mind, than the one which recognizes the comparative insignificance of the means and resources that have been applied to disclose and extract the deeply rooted and valuable ores from the base of this mountain. The common ant, it is affirmed, will not construct its hillock where it cannot obtain water, sometimes boring into the earth 40 feet, or more, to attain this desideratum. This example if imitated by civilized man in his search after mineral wealth, would, in proportion to his size, take him more than 6000 feet below the earth's surface. If this humble insect can achieve this much for supplying its daily necessities, what would naturally be expected of ambitious man, in his efforts to acquire his most permanent and costly riches? Possibly the language of Solomon, concerning this insect would be very appropriate at this time for those who have no faith in deep mining when he says, "Go to the ant, thou sluggard: learn of his ways and be wise." But as the newly discovered bonanzas of Leadville, during the past month of January 1886, appear to have so effectually exploded the sophistries urged against deep mining, we deem with pleasure a class of views, which on fuller and more careful investigation, we feel assured would never have been brought to the surface from respectable sources.

The ancient natural philosopher and mechanician Archimedes, boasted at one time, in the presence of his credulous admirers, that if they could furnish him a place to plant his lever, he would move the world. As the world still moves in its usual orbit, it is quite probable that his friends found no suitable place to locate his mammoth engine, or catapult. Still as the mechanism of his times, of more than 2000 years since, was found adequate to burn a hostile fleet in the harbor of Syracuse, by means of an immense concave mirror, it proves what gigantic strides were made even in that dimly

remote age, to supplement the feeble powers of man, through mechanical agencies. Nature seems to utter her voice on every hand, to the human family and speaks to man in this wise, "Come and take me." When he finds his arms too short, or his bare physical forces too weak to accept the generous invitation, he is compelled to stretch out other arms formed of steel, steam, water, fire, wind, electric currents, or whatever else may be found available or controllable to secure the coveted treasures.

What most affects and concerns his reasoning faculties are such queries as these: "Will the end justify the use of the means? What is the rationale of the whole investment? Will the income correspond with the output? Do the probabilities of success more than balance the probabilities of failure?"

Having won success in one, two, three or half a dozen instances in this same field of labor, are the grounds quite as probable now that I shall win success again, if similar trial efforts are put forth? Never possessing certainties from the beginning in regard to any future developments, am I as well pleased now with the basis of all my previous successes to wit, probabilities on which to prosecute the same class of work in the present and the future as when I first won the prize? Finally, have I taken into view the possibly greater expense of capital and labor which succeeding and more extensive efforts will necessarily involve in this class of mining industry?

When these reflections are carefully applied to the mining interests here, they will raise to the surface something more than spasmodic efforts, silver divining rods, or presumptive theories. They would contrariwise naturally settle down and amalgamate into a solid and well-fixed purpose.

To Devise a Well Arranged System

To secure the most powerful and effective mechanical agencies, and to obtain the fullest amount of investment in capital and labor that could be employed to the highest advantage and with the greatest measure of success.

The lode interest here, of which the Comstock is by far the most important and productive, has been visited, as it were, by a storm, its surface treasures torn from its bosom and scattered to the four winds of heaven; and yet but few considerate mining men would, for a moment, hazard the opinion that these lodes have received more than a tenth part of the requisite attention toward their complete development, which their intrinsic merit justly demand.

Indeed, so small a part of the lode interest here, in comparison with the whole, has been explored that numerous and successive generations of people, at the present rate, will doubtless have to be assigned to this task of exploration and extraction. It is well known that quartz mining in this country was in an embryotic state when the Comstock lode began to startle the world with its immensity of mineral wealth. In fact, the history of this camp, and that of quartz mining in this county are, in the main, contemporaneous.

The Plants and Improvements Here

Are, in some measure, a collection from almost every mining zone of the civilized world, wrought up, modified and added to by the brightest and most expert mechanical genius of North America. The advancement has been steadily pushed forward, from the simplest horse-whim and the crudest Mexican arastras, to those stupendous plants known as the Norcross combination and the Union works, which, in the department of mechanics, are as startling objects to the eye of the spectator as are the Great Eastern or the dome of St. Peter's, in their sphere of architecture. Germany, Austria, France, England and the isles of the sea, have, each and all, sent up hither their latest improvements to aid in the various and diversified modes of ore extraction and ore reduction. Wherein one has failed, another has supplied the want, and wherein all have come short, the ever-ready and inventive talent of the American machinist has come to the relief of all, remodeling, and, oftentimes, creating anew the necessary machinery to carry forward the proposed work. Whatever wealth could purchase, or whatever genius could invent, has been lavished and poured out upon this mountain crest. To put this extensive, complicated and costly mechanism into successful operation none but the most gifted in practical engineering science and mining talent could ever have accomplished in its vast responsibilities or have surmounted its multifarious obstacles. Such work, performed by such workmen, is apt to be accounted of little note where the whole drift and rush has been, and still is, to secure the material plunder. The stately ship rides at anchor, the hurrying passengers disembark, a prosperous voyage has been concluded, and still but few are grateful to the watchful captain, or perhaps bestow a second thought upon the noble pilot at the wheel, who, with steady nerve and sleepless eye, has brought the frail craft in safety across the billowy seas. So here, as elsewhere, in all great undertakings, men have been found to meet the exigencies and the duties imposed upon them, and whilst others have reposed in conscious security of a day-dawn of prosperity awaiting them, these, with tireless vigilance and anxious concern, have paced the hurricane deck of the enterprise at all hours, and felt relieved only when the grand undertaking was accomplished. Whilst this famous camp has been

Prolific in Bonanza Ores,

It has been no less generous in its production of great and noble hearts, crowned by wise and sagacious heads. Whilst a multitude of the unworthy have grasped unearned and unmerited prizes and fled to remote districts of the earth, not a few are living, both here and elsewhere on these Pacific shores, whose names will ever be cherished by vast numbers, whose lives were so richly blessed, in consequence of their relations to this camp. Indeed, there have been and are still, kings, princes and nobles here, whose lives and manly integrity would not be seriously modified by carrying a brace of bonanzas in either pocket, and whose memory a grateful public will not willingly let die. To such, a mountain as lofty as Mount Davidson itself (named after Prof. George Davidson), towering 1500 feet above this city, would be but a feeble expression of respect due to the priceless character thus wrought out from this fiery furnace and crucible of mining industry during the past score of years.

Mineral and Metalliferous Veins.

EDITORS PRESS:—While perusing your interesting paper of January 2d, I noticed the letter from Mr. Chenoweth on mineral and metalliferous veins. Since then, however, I have been expecting to see a reply to it from some of your readers, but thus far none has appeared. The assertions made by Mr. Chenoweth are so unreasonable to me, that I cannot allow his letter to pass unheeded. Regarding mineral veins, Mr. Charles F. Blackburn said in a previous letter, which appeared in your issue of December 5th, that "fissures are usually caused by foldings or wrinklins of the earth's crust, produced by contraction of its interior." Now Mr. Chenoweth thinks it would be difficult for anyone to explain logically how such effects could be produced by the cause which Mr. Blackburn alleges. I think it is very easily explained. Professor Le Conte, who is considered an authority on this subject, fully explains the statement of Mr. Blackburn, in his excellent work on the Elements of Geology for 1879. On page 221 regarding fissures, the professor says: "Fissures are fractures in the earth's crust, passing through many strata, and even sometimes through many formations. The cause of fissures is evidently always movements and usually foldings or wrinklins of the earth's crust, produced probably by contraction of the interior portions, as will be explained under Mountain Chains."

On page 240, under the heading of Mountain Chains, the philosophy of this contraction is plainly shown; it reads as follows: "Mountain chains seem to be produced by the secular cooling, and therefore contraction of the earth, greater in the interior than the exterior. Or, to explain it more fully, by the greater interior contraction, the exterior crust is subjected to enormous lateral pressure, which crushes it together and swells it upward along certain lines, the strata by the pressure being at the same time thrown into more or less complex foldings, etc." The professor further says on page 245: "In consequence of the foldings we find associated with mountains, fissure veins, dikes, etc." Now if the above does not explain logically the cause of fissures as set forth by Mr. Blackburn, then I do not understand the English language. I could give more extracts from Le Conte, and cite other authorities in further explanation of this subject, but think by the time this letter is finished, I shall have encroached considerably upon your space. Nevertheless, Mr. Blackburn's assertion is the generally accepted theory as to the usual cause of fissures. In speaking of the filling of fissures Mr. Blackburn said: "Their contents have been deposited from hot alkaline waters, holding the various mineral substances in solution." To contradict this statement Mr. Chenoweth says: "At Steamboat springs, near Virginia City, there may be seen ocular disproof of the correctness of Mr. Blackburn's speculations. It may there be seen that at some time subsequent to the drift period there began a flow of hot springs at the summit of the western border of Shallow valley, the water of which, on cooling, formed a continuous rocky deposit of considerable length, parallel to the direction of the valley." Wonderful phenomena, indeed! This is, no doubt, great news to the scientific world. Just think of it! Mr. Chenoweth actually carries that the hot water of Shallow valley carries minerals, lime, etc., in solution, and upon cooling, these substances were really deposited and formed a continuous rock deposit. A most extraordinary discovery, to be sure. Will any of your readers kindly show me where Mr. Chenoweth's declaration disproves what Mr. Blackburn said regarding the filling of fissures? I would like very much to know where this "ocular disproof" of our present accepted theory of the formation of veins comes in. On the contrary, this attempted "ocular disproof" goes to show that precisely what Mr. Blackburn did say on the subject was true. Mr. Chenoweth then goes on to say: "In the course of time, as the accumulations extended over the soil toward the lower part of the valley, the weight became so great as to cause the soil on the outer edge to yield, and let the rock there sink, so as to produce fissures farther back, by fracture parallel with the direction of the valley." Now, I think Mr. Chenoweth talks wildly; his first statement about fissures is bad

enough, but this last attempt—well, it's really too bad. He writes as if he actually witnessed the sinking spectacle himself, and says positively that the weight became so great as to cause the soil on the outer edge to yield, etc.

Will Mr. Chenoweth please explain how a solid mass of earth, firmly supported, can yield to such a light weight on its top, without any interior contraction? There is about as much reason in saying 50 or 100 tons of rock placed on top of a solid cube of granite, 200 feet dimensions, would cause it to sink, break and form fissures. Mr. Chenoweth further says: "At this time the roaring of boiling waters may be heard deep down in these fissures, while steam is continually ascending through them to the surface, and being condensed on the sides of the fissures, produces a smooth white crystalline surface, entirely different in appearance from the matter which the same waters formed by sedimentary deposition." We are now told that the steam escaping from the hot waters of this heated interior is condensed on the side of the fissures, and produces a smooth, crystalline surface, entirely different from that formed by the same waters by the sedimentary deposition; that is to say, the steam and hot water, after dissolving out say limestone, comes up through fissures, and on coming in contact with their cooler sides condenses, and depositing the lime, forms a smooth, crystalline surface, unlike the sedimentary deposits of the same waters. In other words we are informed that a smooth lime surface, like the surface of stalactites, is different from sandstone. On the whole, Mr. Chenoweth's letter strongly shows that the fissures of Shallow valley were occasioned by contraction of the earth's interior, and in consequence the great weight on its top yielded, and sinking produced fissures. After the fissures were formed, the hot water, steam, etc., that came from a hot interior, dissolved out the lime, and possibly other minerals, and on coming in contact with the cooler sides of the fissures on its way up, deposited the lime, thus produced a smooth white crystalline surface. The same process is now going on in the Cave mine and stalactites are being formed; the waters, however, here are cold instead of hot, and as they contain more or less carbonic acid, the lime is easily dissolved, and afterwards by evaporation is deposited again in the most beautiful forms imaginable. Veins are also supposed to be usually formed by the same principle: that is by holding the minerals in solution and afterwards depositing them in the fissures. I, in conclusion, would say if Mr. Chenoweth thinks that Mr. Blackburn or any learned man on geology has the idea that veins are formed entirely by sedimentary deposition, he is badly mistaken. Sometimes I am inclined to believe that Mr. Chenoweth's letter was written for sarcasm more than anything else, because, in my opinion, he proves exactly the opposite of what he states.

Cave Mine, Utah.

A. A. GODEE.

BOILER INSPECTION.—The judiciary committee of the Board of Supervisors requested an opinion from the city and county attorney as to the power of the board to pass an ordinance appointing an inspector of steam boilers and regulating their use.

Attorney Love says: "I have grave doubts as to the power of the board to create officers and compensate officials in the absence of any permission given in, or that may be implied by our charter. But I would suggest that any ordinance to the effect proposed is unnecessary, in view of the statute still, in my opinion, governing the whole subject. By an Act entitled 'an Act for the appointment of inspector of stationary steam boilers and steam tanks and for the better security of the life and property in the city and county of San Francisco,' approved March 27, 1876, the Legislature made provision for the appointment and compensation of an inspector and for the inspection of boilers. That Act became and is a part of our Consolidation Act, and after the adoption of the Constitution of 1879 could not be repealed by any Act of the Legislature. Although on March 12, 1880, the Legislature passed an Act to repeal it (Statutes of 1880, page 28) in my opinion this repealing act was ineffectual, and the original Act remains in force as unassailable as the Act relating to the Police Commission, the city and county revenue, the public streets and the like."

DURING the last quarter, the Paradise Valley mine, of Nevada, worked 2,099 tons of ore, the gross yield of which was \$60,895.88, and the total cost of production was \$48,428.07, leaving a net profit of \$12,467.81.

A GERMAN carp, weighing twelve pounds, was caught by B. M. Fish in the Sacramento river, above Knight's Landing, on Saturday last.

NEGOTIATIONS are pending for the building of a mill on the gold ledge on the Big Copper mine, Lost River, Idaho.

NEW mines are reported some 15 miles west of Wm. Nichols' hay ranch, on the Austin road, Nevada.

THE Soda Lake district, San Bernardino county, is assuming great prominence, and two camps are lively.

THE mill recently erected at Lost Basin, Arizona, is working all right and turning out hullion.

MECHANICAL PROGRESS.

A NOVELTY IN NAIL-MAKING.—Mr. John Coyne, well known as the inventor of the nail self-feeder bearing his name, states that a new and improved method of manufacturing a semi-wire nail will soon be put in use in some of the Pittsburgh mills, which will revolutionize the nail manufacture. By this method semi-wire nails of square section, boat, barge, track and railroad spikes, as well as the common cut nails, can be made on the cut-nail machines now in use, without changing the manner of the operation. The improved cut nails will be of the same pattern and appearance of those now made, except that the inclined sides will be smooth and the parallel sides will be cut or rough surfaces, thus increasing the adhesive or holding power of the nails. Semi-wire nails made by this method will be of square section with four parallel sides and a chisel point, while the output will be at least three times that of the regular wire nail. The boat, barge, track and railroad spikes will have the same appearance as the most perfect now made from rods. The heads will not come off in the driving, by vibration or extraction, and any shape of head can be produced. In addition to the increase of output, it is estimated that the improvement will save at least four dollars per ton on the labor cost in manufacturing nails and spikes. The only change involved will be a modification in the process of rolling the plates. —*Progressive Age.*

TO TEMPER TOOLS.—This quality of the steel should be uniform throughout; indeed, it is always better to have them tempered rather too hard than soft, for use will reduce the temper. If at any time it is necessary to perform the operation yourself, the best method is to melt a sufficient quantity of lead to immerse the cutting part of the tool in. Having previously brightened its surface, plunge it into the melted lead for a few minutes till it gets sufficiently hot to melt a candle, with which rub its surface; then plunge it in again and keep it there till the steel assumes a straw color, but be careful not to let it turn blue. When that is the case, take it out, rub it again with the tallow, and let it cool. If it should be too soft, wipe the grease off, repeat the process without the tallow, and when it is sufficiently hot, plunge it into cold spring water, or water and vinegar mixed. By a proper attention to these directions, and a little practice every workman will have it in his power to give a proper temper to the tools he may use. If a saw is too hard, it may be tempered by the same means, but as it would be not only expensive, but in many cases impossible to do it at home, a plumber's shop is mostly at hand, where the process may be repeated when they are melting a pot of lead. But here observe that the temper necessary is different to other cutting tools; you must wait till the steel just begins to turn blue, which is a temper that will give it more elasticity, and at the same time sufficient hardness.

THE IRON FURNACES.—The January report of the condition of the pig-iron furnaces of the United States is very encouraging. It shows that there were in blast January 1st a total of 275 furnaces, with a capacity of 91,814 tons. Compared with the previous month's statement, it is shown that during December 25 furnaces have gone in blast—10 anthracite and 15 bituminous—while the increase in weekly capacity was 6848 tons. The improvement has been most noticeable since October 1st, at which time 75 anthracite furnaces, with a weekly capacity of 20,318 tons, and 88 bituminous furnaces, with a weekly capacity of 43,234 tons, were in blast. The number of anthracite furnaces in blast January 1st was 104, with a weekly capacity of 129,811 tons, and the number of bituminous furnaces in blast at the beginning of 1886 was 114, with a weekly capacity of 54,199 tons. The improvement in the iron industry during the last quarter of 1885 is thus seen to have been reflected in the going into blast of 29 anthracite and 26 bituminous furnaces, or a total of 55 furnaces, with a resulting increase in weekly capacity from 63,552 tons to 84,010 tons, or 32 per cent.

THE WORTHINGTON PUMP which was chosen by the British war office to supply the troops engaged in the late Suakin-Berber expeditions with water, by means of a pipe line from Suakin, has lately come into use as fire pumps in English mills and manufactories, in connection with an arrangement of automatic sprinkling pipes, which is fully described in *Engineering*, of November 13th.

In the same paper is found a notice that the American Elevator Company have been instructed to supply two of their lifts for passenger and goods to the hotel Bristol, in Paris, a compliment well deserved by an industry that has done much to make life in large cities comfortable.

FORMING SCREWS ON SHEET METAL PIPES.—The ordinary stove pipe has been a favorite theme for the exercise of harsh language ever since it was first invented. Most men imagine they have an average amount of scientific knowledge, at least enough to give them courage to tackle a stove pipe, but how many hearts have been made sad from this common conceit!

Now, it does require some mechanical knowledge and patience to put up a stove with the ordinary pipe, and not be found in a first-class swearing condition when the job is completed! The trouble with the ordinary pipe is that it is not suited to the average mental capacity of our race, and hence the trouble. And now a machine has recently been invented and patented for forming pipe with threaded end which will invariably fit, and can be put together and taken apart without the exercise of judgment above the ordinary.

THE ECONOMY OF FUEL.—D. C. Clark in his work upon the economy of fuel says, "that only two methods present themselves, by which the supply of air and the want of the furnace can be made to correspond—either both must be made constant and regular or the fluctuations of one must be made coincide with those of the other," and he proposes to achieve the desideratum sought by an increased supply of air at the cooling by throwing open a sliding valve in the face of the door, which immediately commences closing slowly and automatically, and affords a greatly diminished supply of air to the furnace in harmony with the greatly diminished requirements of the fuel. The area valve, and the period of time throughout which the act of closing is to be prolonged being adjusted according to the nature of the coal and the average quantity supplied at one time. The outer furnace should be double and the air should pass into the furnace through a series of perforations in the inner plate. By this arrangement three important points are secured. First, the heating of the air; second, its subdivision into minute jets; and third, the keeping of the outer surface comparatively cool and thereby both economizing heat and preventing its radiation outwardly to the attendants.

MACHINERY AND ITS APPLICATION.—To a representative of a past epoch the new applications of machinery and the new methods of manufacture are a revelation, but there are stranger things in store for their successors now coming upon the stage of action. There is yet a vast reserve of mechanical skill to draw upon, and the inventive genius of the age is only just beginning to be developed. The skillful machinist of to-day may seem a veritable ignoramus in the eyes of posterity, and the man of the next century will undoubtedly find much in the changes of a single generation to challenge his astonishment and defy his comprehension. We of the present do not realize that a boundless field of discovery is opening up to us, and that new explorations are being and will be made. Thus, at every step, we shall find new and better, shorter and cheaper methods, and that certain principles and devices are capable of being indefinitely extended. Though past achievements border upon the domain of the marvelous, they are but the alphabet to the possibilities of the future.

A METALLIC TELEGRAPH POLE has been adopted by the Canadian Government for its telegraph lines on the northwestern prairies. The pole is constructed of malleable galvanized iron, and one and one-half inches in diameter at the top, and two and one-fourth inches in diameter at the bottom, and weighs less than 50 pounds. The bottom of the pole is set into a claw-plate, upon which the earth is closely packed to a height of about two feet. Then another plate is put into place around the pole and the earth is packed upon it to the level of the ground. The claw-plates take a hold in the ground at once, so that the pole becomes solidly fixed immediately after being set, which desideratum is only obtained by the ordinary wooden pole, after it has been in the ground for at least a year. A recent test is said to have shown the great strength of the pole, as a heavy No. 6 Government wire was strung, and the poles subjected to the greatest possible strain, but without moving them in the least.

THE MATERIAL USED IN KNIFE HANDLES.—Few people know the exact nature of the material generally used in knife handles. Aside from bone, tortoise shell and pearl, with which nearly everybody is familiar, the majority of knife handles are made of a wood known to the trade as cocobola, which is imported in large quantities from Panama. It is of special value for the purpose on account of its close texture, freedom from knots and flaws, and consequent disinclination to split. Many well known kinds of wood require varnishing and polishing and filling up of crevices before they attain the beauty for which they are famous. It is brought to this country in chunks, not in strips and planks like other woods. Sometimes the pieces weigh 500 and 600 pounds each, but generally much less. It costs two and one-half cents a pound.

THE BEST WELD.—Mr. Purvia, an English engineer, read a paper before the Institution of Naval Engineers on large forgings. Speaking of the different kinds of welds, he gave the preference, for heavy work, to the scarf weld, and considered the long V weld next best. He submitted some large specimens of welds, made by the use of sledge hammers, screws and the steam hammer. Upon trial all of the welds broke at a red heat, by being bent, except the one made under the steam hammer which was repeatedly bent forward and back till black hot, and then broke elsewhere than at the weld.

SCIENTIFIC PROGRESS.

Science in the Dye House.

The many discoveries made during the last 30 years in the field of chemical science, as applied to industrial pursuits, have given birth to an industry which did not exist before the year 1860. This industry is the manufacture of the coloring matters or dyestuffs which are derived from coal-tar. The many coloring matters which science has thus added to the list of dyers' supplies in this relatively short period are all derived from a product which was formerly a waste product—coal-tar—and no better example could be cited of the benefits which industries can derive from scientific studies. The effect of the introduction of these artificial colors has been to completely change the methods of dyeing textile fabrics.

The new colors, says the *Journal of Fabrics*, were first received with distrust, owing to the fact that some of them are of a very fugitive character, although most beautiful in shade; so that all aniline colors were declared not fast, and aniline became almost synonymous of "beautiful but frail." This prejudice, however, was slowly but surely dispelled by the discovery of some colors which are as fast as any natural colors can possibly be expected to be, and which are second to none in beauty and brilliancy of shade.

The production of artificial coloring matters is now calculated by millions of dollars. Europe is, of course, the great seat of this industry, Germany being the chief producer of these dyestuffs, being far ahead of any other country as regards the value of the yearly production. The United States are not occupying for this industry the place they ought to occupy as a producer, this production of coal-tar colors being very small in comparison with the consumption in this country, so that the largest portion of what is used here has to be imported. The manufacturers of coal-tar colors being what we may call a scientific industry, it is very much dependent on skill for its success and not on protective duties. This is the reason why this industry has so well prospered in Germany, the country which possesses the most perfect system of technical high schools.

The New Oxygen Process.

The new process for obtaining oxygen from the atmosphere, as introduced by the Brin Brothers, is described as follows: First, the air is drawn, by means of a partial vacuum, through a vessel of quicklime, which absorbs all the carbonic acid and moisture and reduces it to a mixture of oxygen and nitrogen. These gases are then drawn into the retorts, heated at 500 degrees, and the artificial lung absorbs the oxygen, while the nitrogen is drawn off to a gasometer for conversion into ammonia, etc. The Brins have, for the first time, made the artificial lung—baryta—indestructible. The use of baryta for the purpose is not unknown, but hitherto the baryta has been perishable, and has required renewal every four and twenty hours, at great expense. They make it virtually indestructible and unchangeable. In this way they claim to have effected an absolute revolution in chemistry; for, with a lung for the machine, and the atmospheric air for the material, they can make just as much oxygen as they like, and its uses, present and prospective, are almost innumerable and incalculable. For ventilation, aerating water without carbonic acid, for increasing the heat of blast furnaces and the light of lamps, its uses are self-evident.

The nitrogen, which was at first looked upon as wasted, has, by a process due to the same inventors, been turned into ammoniacal salts for manure. Most of the uses of these products were known. What is claimed is the almost fabulous reduction in the cost of production. The chemical text books, according to Messrs. Brin, are at fault as to the possibilities of baryta. They all teach that it is destructible; and the Brins maintain that, as they know how to treat it, it is indestructible. Oxygen in large quantities means a revolution in half the processes of chemical industries.

CHEMICAL ACTION EFFECTED BY PRESSURE ALONE.—It has lately been shown by experiment, that by the simple action of pressure upon two solids, previously thoroughly intermingled in a pulverulent condition, a chemical reaction between the two is effected. The substances experimented upon were barium sulphate and sodium carbonate. About one gram of a mixture of these two substances was submitted to compression; the cylinder produced was pulverized and submitted to the action of water, and the insoluble residue analyzed to determine the amount of barium carbonate produced. It was found that by compression of the mixture, under a pressure of 6000 atmospheres for a few seconds only, nearly one per cent of the barium sulphate had been transformed into carbonate. On subjecting the material of the first cylinder anew to compression, four times in succession, the amount of the carbonate produced rose to 4.73 per cent, and after six to 8.99 per cent. If these cylinders are left to themselves after compression, the chemical action will continue for a period of 14 days, the quantity of barium carbonate produced in the cylinder submitted to six compressions, rising, during that time, to 10.59 per cent. If the cylinder, after compression, be

divided in half, and one of the halves be heated for several hours to 245° Fahr., it is found, on analyzing the two halves, that the barium carbonate formed has actually diminished during the heating, the percentage falling between one and two per cent.

AN IMPORTANT DISCOVERY has recently been announced in connection with the new process lately introduced of extracting the saccharine matter from the cane. It has long been suspected that the presence of leaves and sheaths enveloping cane has hindered the successful production of sugar from sorghum by the diffusion process. But no careful effort to estimate the extent of this hindrance was ever made until a series of tests was undertaken under supervision of the New Jersey agricultural experiment station. The results of this study as recently published, are of unexpected importance. Not only has it been demonstrated that sugar from cane worked without leaf or sheath is of superior quality, but the expense of evaporation is so notably lessened that some cheap method of stripping the cane seems to be the only thing needed to insure financial success. A machine for this purpose has already been prepared, and the experiments will probably mark an era in the history of this industry. By the old method of pressing the juice from the cane, the best equipped mills secured only 70 pounds of the 145 pounds of sugar in a ton of cane. By first getting rid of the leaves and sheaths the diffusers secure 130 pounds.

THE ELECTRIC LIGHT ON LOCOMOTIVES.

Some time ago electric lights were fitted to the locomotives running on the Nichols Railway, between St. Petersburg and Moscow. For awhile, says the *London Engineering*, they appeared to give satisfaction, but at length the staff commenced to complain of them, and now, after an investigation by the directors, they have been totally discontinued. The lamps were powerful, throwing a stream of light a mile ahead of the train, and so far as the illumination of the railway track was concerned, the locomotive drivers and guards admitted their utility. Their objection to them was, however, that the contrast between the lighted space and the darkness on either side was so acute that it annoyed the eyesight, and in some cases, after a time, incapacitated the drivers altogether. Medical evidence was adduced by the company's doctors, proving in one or two instances the vision had been so injured as to provoke fears of blindness.

THUNDER RAIN AND ORDINARY RAIN.—There is a marked difference between the water which falls in an ordinary rain and that which is accompanied with electrical displays, or as it is sometimes called, thunder rain. Palmin says, in regard to the latter, the cloud from which it falls must be regarded as a constant flowing source of electricity. There can be no thunder or lightning without rain, notwithstanding the not infrequent assertions of thunder in a clear sky. Such reports are either from distant clouds, or the result of some other cause than a discharge of electricity. Harvest, or "heat lightning," is merely a distant storm. It is seldom that thunder is heard as an accompaniment to heat lightning—as thunder cannot be heard beyond 12,427 miles, while lightning is often seen, by reflection upon nearer clouds, at a much greater distance.

NATURE'S TRANSFORMATIONS.—In all the transformations of Nature, vegetable or animal, there is nothing more wonderful than that which occurs to the little inhabitants of the pools, known as tadpoles. A tadpole, the larva of a frog, has a tail and no legs, gills, instead of lungs, a heart precisely like that of a fish, a horny beak for eating vegetable food, and a spiral intestine to digest it. With the approach of maturity the hind legs appear, then the front pair; the back falls off, the tail and gills waste away, the lungs are created, the digestive apparatus is changed to suit the animal diet, the heart becomes reptilian in type by the addition of another auricle; in fact, skin, muscles, nerves and blood vessels vanish, being absorbed atom by atom, and a new set is substituted.

THE NATURE OF COAL.—Some investigations made relative to the heat of combustion of stone coal have led to the conclusion by Menier and others that during the formation of coal a certain quantity of heat must have been absorbed since the theoretical heat of combustion was always less than that actually observed. From want of knowledge, however, as to the real constitution of coal, it is regarded as impossible to determine the nature of this absorption. It is also a fact that, from want of knowledge as to the composition of coal, the heat of combustion cannot be calculated. It is well known that two coals of precisely the same chemical composition may and do afford very different degrees of heat in combustion.

A NEW KIND OF PAPER of very wide application has recently been introduced. Two sheets of Manila are taken and run through calender rolls, the sheets being placed with the fiber at right angles. Afterward the paper, now combined, is run through corrugated rolls. The result is a paper which can be sewed like cloth and is very durable. Such paper could be printed like calicoes or stamped like counterpanes, etc. It is a great advance on papers heretofore used as cloth substitutes.



A. T. DEWEY.

W. B. EWER.

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Passing Events.

There is a small gold excitement in Monterey county, not far from Soledad, an account of which is given in our Mining Summary. The region is not one where gold has been discovered before, and it does not seem probable that there will be any very big district developed.

The Honduras mines are attracting some little attention, but so far the reports received are rather vague.

In many places in the mountains the prospectors are out again and are at work. In the higher places, however, there is still too much snow for prospecting.

A good many gold mines are being reopened in this State at present. It is probable that there will be more or less inquiry for gold mines this summer, from which our California prospectors should profit.

The State Mineralogist has received a magnificent specimen of chichromate of iron, weighing over 150 pounds. It was sent from Scotland. It is entirely red in color and is a beautiful illustration of the crystalline formation. What makes it interesting is the fact that it was made out of California chroms iron. Large quantities of this iron is shipped to Scotland from California and used in the manufacture of chromate of iron and chromide of iron.

The International Geological Congress.

The meeting of the International Geological Congress was held according to the program in Berlin, and was well attended by delegates from the principal European nations. The United States was represented by Professors Hall, Newberry, Brush, Williams and Frazer.

The inception of this international gathering of geologists dates from the action of a committee at the meeting of the American Association for the Advancement of Science in the year 1876. The first congress was held at Paris in 1878, and the second at Bologna in 1881. At this Bologna meeting it was decided to prepare a geological map of Europe, and the work was confided to a committee which reported progress at this last session in Berlin. At the opening of the congress, by Professor Capellini of Italy, the president of the Bologna Congress, the Prussian Cultus-Minister, Herr Von Gossler, was introduced and gave an address of welcome in German, dwelling upon the fact that no science could advance without the aid of the other sciences. He reminded his audience that "Prussia had been the home of Von Buch and Von Humboldt, and in the name of the Prussian Government he warmly appreciated and recognized the honor conferred upon Berlin by the congress in choosing Berlin as its place of meeting and made the members welcome with the miners' greeting—"gluck auf." The proceedings of the congress were then conducted under Dr. Von Dechen, the honorary president, and Professor Beyrich as president and M. Hauchecorne as secretary, with a council of 20 members.

The geological map of Europe will be printed and published in Berlin. It will be divided into forty-nine sheets, which, when united, will form a rectangular map about twelve feet square. The topographic base will be prepared by Professor Kiepert, of Berlin. The International Committee guarantees to take 900 copies at 100 francs per copy, but the trade price will be 125 francs. Each national committee will furnish the geologic symbolization for its own country, and these contributions will be harmonized and connected under the committee of direction. The coloring will conform to the international scale of colors decided upon at the Bologna meeting, using graduated tints of the same color to represent the sub-divisions of each period—the deepest tints representing the oldest divisions. Portions of this map are completed, especially Central and Southern Italy.

The proposition to represent the Permian carboniferous formations by a gray color in three tints, and under the title of "Carbonic system," gave rise to a protracted debate. Professor Hughes, of Cambridge, England, objected to the union on the ground that the discordance between the two formations in England is enormous. M. Nikitin, of Russia, also objected. Professor Renevier (Switzerland) defended the proposition and thought the Culm, Carboniferous and Permian really constitute one system. Professor Newberry expressed the convictions of Professor Jas. Hall and his own, that in America there is no distinctive Permian but an insensible transition from the Carboniferous beds to those which correspond in position to the Permian, and that there is no strict line of demarcation between the Trias and the Permian, so-called. It was finally decided to preserve the present classification, and not to unite the two formations as one group. Objection was also made by Professor Hughes to the use of the word "Silurique," proposed by M. Renevier to include the Silurian and Cambrian, and he was joined by M. Jacquot (France), who stated, in support of the objection that the difference between the Silurian and the Cambrian could be easily seen in every part of the extensive line of contact between them in France, the Pyrenees and other places. Prof. Renevier explained that the proposition was merely to use one general color for these formations and to distinguish them by differences of tint.

The use of the names "Archean," "Primitive" and "Pre-Cambrian" was also discussed. The English geologists prefer the term Archean to Pre-Cambrian, and Archean was finally adopted. In the opinion of M. Jacquot, it is not at present possible to subdivide the Archean in France. It is deemed best to represent the mica-schists and the gneisses in the same manner. M. Firket objected to the term Azoic, as it begs the question of the existence

of life. In this report by Prof. Frazer for American delegates, attention is directed to the priority of the term *Taconic*, proposed and long defended by Dr. Emmons, and since discussed by M. Jules Marcou, in a paper published by the American Academy of Science and Arts. This term should be applied to the primordial fauna or equivalents of the Cambrian. Prof. Geikie proposed that the Congress should postpone the subject of the division of the Cambrian and Silurian until the meeting in Eogland, which was agreed to.

In regard to the Devonian, Dr. Beyrich thought it could not be separated from the Carboniferous at an absolute horizon. The three-fold division of the Trias was agreed to, and it was decided to make three divisions of the Jurassic. The troublesome and vexed questions regarding the subdivisions of the Tertiary were finally disposed of by leaving them to the committee under a unanimous vote of confidence.

In regard to the representation of the eruptive rocks, Professor Van Dechen declared that there should not be any distinction between the rocks of extinct and of active volcanoes, or between ancient and modern eruptive rocks. Mr. Blanford objected to the petrographic division of the eruptive rocks, while the sedimentary rocks are divided chronologically, and the whole matter was finally left to the committee.

The committee upon the formation of an international geological society and the establishment of an international geological journal reported favorably, but the council had decided against both plans, desiring to postpone the question until the next meeting of the Congress. The scheme of an international geological journal to be supported by private enterprise, was, however, approved.

In the closing remarks of the honorary president, attention was directed to the fact that the first scientific congress held in Berlin in 1858 was under the auspices of the Baron Alexander Von Humboldt. It was decided that the next meeting of this congress should be in the city of London, England, between the 15th day of August and the 15th of September in the year 1888, and that Messrs. Geikie, Beauford, Hughes and Topley be the committee to prepare for the proper reception of the congress. Professor Hughes repeated his statement made to the council that he had a petition signed by one hundred and thirty-seven English geologists requesting the congress to meet in London. This petition included the names of the Duke of Argyle, the Earl of Eoniskillen, and some of the most eminent geologists of Eogland. Professor Geikie said that English geologists follow the action of the congress with the greatest interest, and would unite in giving it a warm reception.

Molybdate of Lead.

Wulfenite, or molybdate of lead, is more or less abundant in Nevada and Arizona, but is found sparingly in this State. Some has been found, however, in Kern and Inyo counties. The mineral is of frequent occurrence in the ores of Ruby Hill, Eureka, Nevada. It is there found as aggregates of fine tabular crystals coating nodules of galena changed into sulphate and carbonate, and frequently mixed with crystals of the latter, as well as in minute crystals disseminated throughout the ore. Some of the galena contains considerable molybdenum, but whether the quantity contained in it will account for the presence of the considerable amount of wulfenite in some of the ore is a matter of doubt. From the manner in which some of it is found surrounding nodules of galena carrying molybdenum, and from its occurrence mixed with the other products in decomposition of that mineral, it is evident that a portion of it at least was formed by the decomposition of the molybdenum-bearing galena.

The existence of molybdenite (sulphide of molybdenum) has not been detected in the oxidized or unoxidized ore. It exists, however, in the underlying quartzite. Several specimens of this mineral were found in sinking the Richmond shaft from the 900 to the 1200-foot level; also in the crosscut from the 1200-foot station through the quartzite to the limestone. As it is usually found in the quartzite, it is in a very finely divided state, and were it not for a few exceptional specimens that have been found, its presence would have been overlooked. Mr. J. S. Curtis, in his monograph on the silver lead

deposits of Eureka, states that it is probable that its occurrence in the quartzite is due to secondary causes, and that like the pyrite, it was not an original constituent of that rock.

A Profitable Gold Mine.

The Plymouth Consolidated Gold Mining Co.'s property, Amador county, in this State, produced in gold bullion in 1885 the sum of \$850,527.44. The operating expenses were \$319,750.91, leaving a profit of \$530,776.23, which, with the surplus on hand Jan. 1, 1885, left a total of \$635,071.59. From this twelve monthly dividends, aggregating \$570,000, were paid in 1885, leaving a surplus of \$60,071.59.

This company was formed June 1, 1883, by the consolidation of the Empire, the Amador Pacific and the Plymouth Companies. The mines were well developed, and a considerable amount in dividends had been paid. Prior to the consolidation, gold bullion to the amount of about \$2,500,000 had been produced.

The following is a statement of all the receipts and expenditures of this company from its organization, June 1, 1883, to Jan. 1, 1886, a period of two years and seven months:

June 1, 1883—Cash on hand at time of organization of this company.....\$153,319.80

GOLD BULLION PRODUCED BY THE MINES AS FOLLOWS:
For the year 1883 (7 months).....\$ 527,170.50
For the year 1884.....1,033,518.97
For the year 1885.....850,527.44
\$2,441,216.90

Total receipts.....\$2,594,536.00

DISBURSEMENTS.
Operating expenses.....\$860,909.66
Construction.....165,644.03
Thirty-one dividends.....1,525,000.00
2,551,454.64

Cash on hand, Jan. 1, 1886.....\$43,081.45

With such a record it will be interesting to show more of the details of receipts and expenditures for the last year. They were as follows:

RECEIPTS.
Cash on hand, January 1, 1885.....\$74,795.06
Gold bullion produced January.....85,721.00
February.....80,974.87
March.....80,135.03
April.....82,191.67
May.....81,927.39
June.....82,616.70
July.....82,449.83
August.....73,156.97
September.....75,614.98
October.....64,951.36
November.....51,667.16
December.....49,258.49
\$954,822.50

DISBURSEMENTS.
Operating expenses:
Empire mine.....\$125,783.64
Empire mill.....16,582.87
Empire sulphurets.....2,466.03
Empire timber.....10,921.70
Empire wedge blocks.....1,576.00
Empire wood.....1,094.57
Pacific mine.....79,103.50
Pacific mill.....11,743.43
Pacific sulphurets.....2,001.34
Pacific timber.....7,608.93
Pacific wood.....59.73
Pacific wedge blocks.....209.50
Lagging.....4,803.37
Reducing sulphurets.....12,961.14
Water supply—canals, reservoirs, etc.....8,933.06
Charcoal.....370.99
General expenses.....24,806.01
\$954,822.50

Dividends.....\$60,071.59
Surplus.....60,071.59
\$954,822.50

The following has been added to construction account, and paid for out of the surplus:

Surplus.....\$60,071.59
New tunnel on lode line and development of Pacific claim.....\$5,579.37
Construction of shaft on Woolford property.....7,871.14
New tail race.....3,167.03
Tunnel from north shaft.....552.60
\$18,900.14
Cash on hand.....43,081.45
60,071.59

The cash on hand, \$43,081.45, is actual surplus, the company having no indebtedness whatever.

CALIFORNIA AT THE EXPOSITION.—We see by the New Orleans States that California inventions and industries are pretty well represented at the exposition now going on in that city, and to which Mr. C. B. Turrell is commissioner from this State. The display is spoken of as well arranged and as one of the important features of the exposition. Quite an extensive area has been assigned to California merchants, manufacturers and inventors. Among the things shown may be mentioned high explosives, borax, canned fruits, saws, soaps, hydraulic giants, quartz machinery, incubators, village carts and a number of small inventions.

THE Granite Mountain mine of Montana produced 1375 bars bullion up to January 1, 1886, weighing 1,496 522 ounces, estimated to be worth \$1,579,000.

Balance for One Decigram of Ore for the Blowpipe Assay.

[Written for the PRESS by C. H. AARON.]

In the accompanying cut, *A* is the beam, and is nothing more than a slip of wood through which are thrust, at right angles, two needles as shown.

B is the support, made of a strip of tin sheet suitably bent. The top edges should be parallel and smooth.

C is the base—a piece of board, to which *B* is fastened.

D is the pan, made of tin sheet. The top at *D* may be flat or concave. The legs must be so heavy that the pan maintains its position when suspended on the needles and loaded with a decigram of ore, etc., and so long that the pan may rest on them when the beam is slightly declined at that end.

E is a counterpoise made of lead. It is movable on the beam, yet is not so loose as to slip of itself. The center of gravity of *E* should be, as nearly as possible, in a line with the two needles—that is to say, the portion of it which is below a line passing through the two needles should equal in weight the portion above such a line.

To use this balance, put the decigram weight on the pan and adjust the counterpoise so as to lift the pan about an eighth of an inch from the base. Remove the weight from the pan and replace it by ore, reproducing a same condition of equilibrium. Place a finger under the counterpoised end of the beam and raise that, letting the pan rest on its feet. Remove this pan and transfer the weighed ore to the mixing capsule.

The delicacy of the balance will depend greatly on the adjustment of the center of gravity, as in all balances. If on trial the beam is found to tumble to either side indifferently, when equally or nearly equally loaded on each end, the center of gravity is too high and must be lowered by cutting away some wood above the line joining the needles, or by attaching a bit of lead to its lower edge (at the middle is best). If, on the other hand, the beam swings so that it can be balanced, but is not sensitive enough to small variations of weight on either end, the center of gravity must be raised either by whittling from the lower edge or by loading the upper edge suitably. With fine needles and a good adjustment this balance is sensible to one milligram or less.

The lead counterpoise is not to swing freely, but is compressed on the beam so that it forms practically one body with that. The pan, on the contrary, must have free movement, hence the legs must be apart so as to straddle the beam without touching, and care must be taken that they do not touch; this gives width on the top for the ore. All those balances in which the weighing is done by placing the object to be weighed or the larger weights on marks on the beam are unreliable. Although they may be sensitive to a thousandth of a grain, there can be no certainty of placing the object or the weight so that its center of gravity is precisely coincident with the center of the mark, and the error thus introduced may greatly exceed the limit of sensibility of the beam itself. The very small weights may properly be used in this way as the riders of an assay balance, because the possible error in place of the rider cannot cause a material error in the weighing.

The Inverted Siphon.

We would call attention to the discussion of the inverted siphon by P. M. Randall in his series of articles on practical hydraulics, as it is new and of the highest practical importance. Mr. Randall in this discussion, not only points out that in practice the inlet end of the inverted siphon may be placed either too high or too low in its relation to the outlet end, but rigidly demonstrates the proper point so as to attain the greatest economy. Several examples, it will be seen, are given, which fully verify the correctness of his result. The saving effected by the application of the principle enunciated and demonstrated by Mr. Randall is surprisingly large, amounting in extensive operations to immense sums of money. The verification of this statement will be clearly shown by the application of this principle to practical examples in this number of the PRESS.

An apparently inexhaustible quarry of rock salt has been found near Dona Anita, N. M.

Heirs to Chateaux in Spain.

Year after year the State Department at Washington, and the various U. S. legations in Great Britain and on the continent, have had letters showered upon them, heaps upon heaps, asking information about supposed estates awaiting heirs and alleged unclaimed fortunes, in this or that portion of the old countries. Again and again has patient and careful investigation been made by our representatives abroad, when the data furnished by

that came before the association—if we may judge by the reports published in our San Francisco daily papers—was to assist a certain person in taking a trip across the Atlantic, to ascertain the exact status of the Towneley estate. But this measure appears not to have been decided upon; and as the information thus to be sought has already been given at some length in a circular letter from the Secretary of State (a copy of which we have just received from the department) we hope to do the "heirs" a service, and save them need-



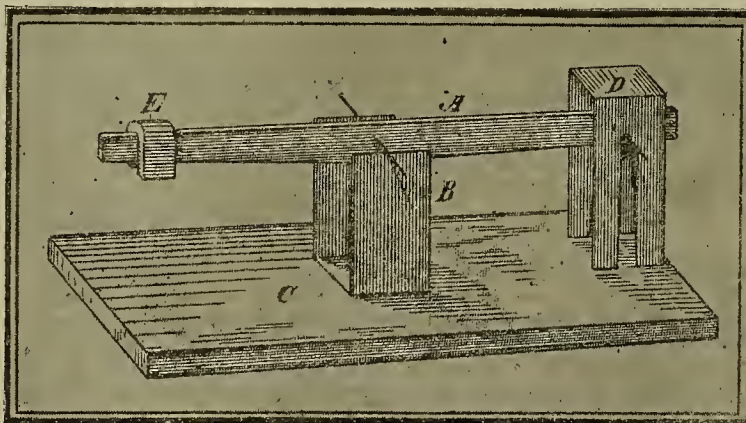
HON. WILEY J. TINNIN, SURVEYOR OF THE PORT OF SAN FRANCISCO.

applicants have seemed specific enough to warrant it, but never, to our knowledge, has it led to discovering the actual existence of any such property. As a general thing, however, the letters—whether from lawyers or laymen—have been so vague as to furnish no clew. "They are all more or less indefinite, many sad, and some ludicrous." "These communications often disclose the fact that the hopeful claimants, generally very poor, and misled, no doubt, frequently by de-

less expense and suspense, by now publishing it without abridgment.

DEPARTMENT OF STATE,
WASHINGTON, December 20, 1885.

SIR: I have received your letter inquiring as to an Act of Parliament passed in August last, and said to refer to the so-called Lawrence Towneley estate. Many letters of a similar character have been received both by this Department and by the legation at London. The prevalent idea of the writers appears to be that the estate in question consists of eight hundred millions of dollars, more or less, which are



BALANCE TO WEIGH A DECIGRAM OF ORE.

signing persons seeking employment as agents or attorneys, had repeatedly paid out considerable sums to prosecute their extravagant claims."

"There is little prospect of a cessation of such inquiries, and no doubt much time and money has been and will be uselessly expended, through the impositions of a certain class of a speculative turn of mind, who work upon the credulity of those who think they may have interests that can be realized." +

The latest instance of this species of hallucination is afforded by the Chase-Towneley craze. A meeting of imagined heirs, to the number of 70 or 80, has recently been held in this city, and an organization formed for the ostensible end of getting their share of a property in England. The first and only tangible proposition

lying in the Bank of England awaiting distribution among unknown heirs, among which are persons of the names of Lawrence and Chase in the United States.

I am informed by our Minister in London: First—That there is no money in the Bank of England belonging to any Towneley, Lawrence Towneley, or Chase estate, or to any claimants under those names.

Second—That there is no such estate in England as the Lawrence Townsley estate, nor any known family of that designation.

Third—That the Towneley estate is a large landed property in the counties of Lancaster and York which is now, and has been for a very long time, in the possession of its rightful owners, who are completely protected therein by the law of England, and that there are no unknown or American owners of any part of it, or any ground whatever for any such claims.

I have also received from our legation at London a few copies of the Act in question, which is a voluminous document of 288 pages. The names of Lawrence and Chase do not occur

in it. It is an act to adjust the equities arising under certain successive marriage settlements and other conveyances executed at various times between 1836 and 1877 in favor of the persons therein named. An amicable suit in Chancery is being conducted for this purpose, and by direction of the Court this Act was obtained in aid of its decree.

The statement widely disseminated in the United States that this Act affords an opportunity, or that there is any opportunity for the prosecution of any American claims to this property, is entirely incorrect. This Department is unable to furnish copies of this Act, but it can be examined here by claimants or their lawful attorneys, and could probably be obtained from London by any importing bookseller. The price of it in London is \$3.37 per copy.

You are strongly advised to pay no attention to any reports or statements of associations in reference to claims on the above-named estate, or to pay any money to agents for pressing the same. Neither this Department nor the legation in London can encourage or aid any investigations in this direction.

I am, sir, your obedient servant,

T. F. BAYARD.

We have also been shown private advices from a reliable law firm in the East, to the effect that the whole business, on this side of the water, was set on foot by designing parties, in hopes of entrapping and fleecing the credulous and unwary. But apart from this, Secretary Bayard's pointed and cogent letter ought to suffice to deter any but the most infatuated from further pursuit of such a will-o'-the-wisp, or, let us rather say, such a wild-goose Chase.

The Surveyor of the Port.

With a view to increase our readers' knowledge of men prominent in the various affairs of the State, we give from occasionally portraits of the leaders in the various lines of thought and action. We place upon this page the portrait of Hon. W. J. Tinnin, recently appointed by President Cleveland surveyor of customs of the port of San Francisco. Mr. Tinnin is a pioneer resident of California. He has been long prominent in public affairs and has gained a wide acquaintance. Born in 1829, on a cotton plantation near Jackson, Mississippi, he lived mainly in that State until 1850. He arrived in San Francisco on the bark Paola, in May, 1850. Taking up his residence in Weaverville, Trinity county, soon afterwards, Mr. Tinnin engaged in merchandising and mining successfully.

In 1871 and 1873, Mr. Tinnin served two terms in the Assembly of our State Legislature. In '75 and '76 he was a member of the Senate; in '79 he was elected to the Constitutional convention, and came within one vote of being its chairman, and for many years he has been one of the leading practitioners in the various law courts of the State. Mr. Tinnin was chosen Grand Master of the Grand Lodge of California of the Masonic fraternity, and thus adds eminence in social and fraternal affairs to his honorable record in the service of the nation.

Mining Accidents

Richard Hales received injuries at the Baltimore quartz mine, Auburn, Placer county, from which he died the next day. He was in the tunnel and had removed a false sett of timbers to put in a true sett, when the ground from the hanging wall caved upon him. His brother Sampson, who had been in the tunnel with him a few minutes before, heard him cry out, and went to his relief, but it took seven hours to rescue him. He did not think himself seriously hurt, and upon being put to bed felt comfortably, but along toward daylight he said he felt drowsy, and shortly after died quietly, caused, no doubt by internal injury.

On Tuesday last, Thomas Quinn, top-carman at the Crown Point mine, on the Comstock, was fatally injured. He was loading timbers on a car on the cags in this shaft at the second surface platform, when the cage, weighing two tons, was dropped, catching him between the upperdeck of the cage and the floor. His ribs were broken and the jagged ends forced through the lungs. The cage alone weighs two tons. The engineer claims that the cage was lowered in response to a bell from below.

HUGH LAMB, a foreman of the North Eod and Con. California & Virginia mine, died at Virginia City on the 22d. Deceased was the most noted practical miner on the Comstock. He had been in the employ of the honanza company as foreman since its organization, and his judgment in mining matters was implicitly relied on by Mackay and Fair.

*Dispatch of A. D. White, U. S. Minister at Berlin, to Mr. Evans, March 20, 1880. +Dispatch of Hon. James Birney, U. S. Minister at the Hague, March 1, 1873.

Rule 49 corresponds to Eq. (204).

ENGINEERING NOTES.

Navigating the Suez Canal by Electric Light.

In presence of the continued increase in the traffic through the Suez canal, even during the present commercial crisis, and to provide for the still greater increase that is anticipated in consequence of the abolition of the pilot dues and the lowering of the tariffs, by which merchandises now reaching Europe from the East and from Australia by the route round the Cape will be able to be sent through the canal, the company has for the last two years been making experiments with electric lights, with a view to enable vessels to continue their passage through the canal during the night. These experiments (says the Paris correspondent of the London Standard) have at length proved so successful that it has been resolved to permit, from the 1st of January next, all vessels of war and postal steamers provided with the requisite electric lights, to navigate by night that portion of the canal comprised between Port Said and kilometer fifty-four. Therefore, in almost half that portion of the canal where ships have to put into sidings to allow other vessels to pass them—in the Bitter Lakes vessels pass each other without stopping—vessels of war and mail boats, that together represent 22 per cent of the total traffic, will be able to continue their passage at all times of the day and night. This will constitute a great saving of time, and M. De Lesseps, in his circular, expresses the confident hope that the trial will be so successful as to enable him to authorize within a short time night navigation for all descriptions of vessels through the whole length of the canal.

New Railroads in South America.

The Argentine Government has recently made arrangements for a loan of \$59,000,000, which is to be expended in the completion of the railroad system of the republic, including two lines across the continent from the Atlantic to the Pacific, in order that the people of the west coast may avoid going way around the Straits of Magellan, which is a very disagreeable journey. A third line is to be extended northward into Bolivia. These are as great enterprises as the construction of our transcontinental system of roads, although the distances across that portion of South America is only about as far as from New York to Omaha. Under the terms of the contract all of the railroads are to be completed within five years from the first of January. The importance of these enterprises to the United States can not be overestimated. They will not only necessitate the expenditure of many millions of dollars for railway supplies, but the men who will be engaged in the work of construction must be fed and clothed with imported merchandise. The development of the country will increase its purchasing power, and the expenditure of nearly \$60,000,000 of foreign money within five years will give the country such a boom as it has never experienced. As this money is to be raised in England, it may be expected that a large part of it will be expended in that country, but the merchants and manufacturers of the United States can underbid those of England on nearly every article that will be required except steel rails; and if they adopt proper means they will be able to increase their exports to the Argentine Republic to a large amount, and get a fair share of the permanent commerce which this enterprise will develop.

BRITISH ENGINEERING.—The British Government has determined that the Soudan railroad through the desert from Suakim to Berber, a distance of 245 miles, shall be standard gauge, and every effort of the department will be made to push it through this season. The route is said to present no serious physical obstacles to the rapid building of a railroad, so there ought to be no difficulty in getting the road completed within four months after the first vessel carrying the labor and plant arrives at the base of operations. British engineers are not, however, famous for expedition in pushing forward railroad work. There is generally too much devotion paid to following established rules and precedents, and the system of using iron chairs for the rails to rest on, with all the additional parts entailed, is not conducive to rapid laying of track. From what we know of German military performance in rapid railroad building, we are not sanguine of the British war office getting their railroad built so rapidly as necessary. In connection with the siege of Metz, the Germans had to build a short railroad 23 miles long. All the assistance that an unlimited supply of men and money could provide was called on to push the work, and difficulties of construction were light, yet they were 50 days in getting the first train over that short line.

RAPID ENGINEERING WORK.—General Grant in his paper published in the November Century, describes the manner in which General Dodge, with 8000 men, repaired 102 miles of railroad in Tennessee and Alabama, and constructed 182 bridges, many of these over deep and wide chasms, and that all of this work was accomplished in 40 days.

USEFUL INFORMATION.

AN OIL ECONOMIZER.—An apparatus has been designed and patented by Messrs. Thornton and Tate, of Mount Vernon, Ind., which is designed particularly for the cleaning of oil which has been used upon machinery. Oil which heretofore has found its way to the coal pile on account of not being suitable for use again because of its condition, can, by the use of this apparatus, be made perfectly clean. The economizer is guaranteed to do the work of four gallons of oil, and at the same time only drawing one; in other words, one gallon can be used four times, and thus save three gallons out of four. This machine in actual service has cleaned the oil sixty times, the oil after each cleaning being again used, keeping the engine and machinery bearings smooth and cool, thus showing that neither dirt nor grit was left remaining in the oil. Consumers of oil are requested to investigate this matter closely, and reduce their heavy oil bills by using one of these machines. Among the advantages claimed are the following: It will keep the oil free from grit and dirt, saving a risk of heating or cutting the bearings. It will save expensive repairs, as oil can be used in large quantities without loss. It will separate any water that may accumulate in the drippings, from valves or piston rods, or other causes, leaving only the clean oil. In large establishments it will pay for itself in a year. No matter what kind of quality of oil is used, it will clean the drippings.

MINE EXPLOSIONS.—The investigations made by the Prussian Fire-damp Commission to ascertain the causes of explosions in mines show among other things, that many explosions attributed to firedamp, or outbursts of gas, are really due to the fine coal dust in mines. It appears that all kinds of dust are capable of exploding violently when ignited by such means as the electric spark, and that the explosion extends much further with coal dust than with firedamp. The experiments relative to this inflammability of coal dust are stated to have been devised as nearly as possible in accordance with the conditions prevailing in practice, and were carried on at the Koenig mine Neunkirchen, Sarrebruck. A gallery, or drift, driven from the surface, was chosen as the place for treating the dust, means being also provided for keeping the particles in a state of violent agitation by currents of air. To provoke ignition of the dust the electric spark was made use of, a means that is far from furnishing that volume of flame found by the French experimenters to be necessary to explode coal dust. The tests were many times repeated, more than two hundred times in all, explosions occurring in every case.

A REMARKABLE BOILER EXPLOSION was reported in the daily papers on the 15th inst., as having taken place at Harper's rolling mill, in Newport, Ky. The belting slipped from a large fly-wheel in the engine room, causing the wheel to explode, and a piece weighing nearly a ton struck two boilers near by, causing them to blow up, owing to the terrific force of the blow. Another piece of the wheel went up in the air and landed on the river bank a quarter of a mile distant. Fully one hundred men were in and around the mill at the time, and it seems miraculous that the casualties were so few, for only three persons were seriously hurt and only one fatally. The conclusion to be reached is that steam boilers are never safe, for even a non-explosive boiler would have hardly withstood so severe a blow without retorting in kind. A mule would not have stood such treatment without at least giving a parting kick.

CLEANING NEW RUBBER CORKS AND TUBING.—New rubber corks and tubing are always coated with more or less sulphur, and perhaps also some of the "filling" that is often added to them (which is often powdered soapstone). Mere washing in water will not remove this coating, especially from the inside of tubing. It is best gotten rid of by boiling the goods in a solution of one part of sulphide of sodium and two parts of caustic soda in 10 parts of water. The tubing should be lifted out of the liquid occasionally, and carefully reimmered, so that new liquid will pass throughout its bore. After having been thoroughly hoiled in this manner the goods are carefully washed in water. If the tubing is previously treated with warm water and thoroughly kneaded or beaten, to loosen the coating adhering to the inside, the above described cleansing process will be much more thorough.

TIN PLATES A MILE LONG.—"Tin plates a mile long" is rather a startling announcement, yet Sir Henry Bessemer hints that the means for producing such will be his next contribution to the science of practical metal working. His plans are not entirely made public, but in general they contemplate running the steel through the rolls and bringing it out plated with tin in sheets of any length, and then cut into plates of any desired size. The experiments are pronounced successful, and patents have been sought on the process.

POLISHED IRON JEWELRY.—What the old alchemist failed to do modern mechanics have accomplished, in effect at least. They have not exactly transmuted base metal into gold,

but they are making polished iron jewelry that is as attractive in appearance as gold filigree. The iron is highly polished and reflects light like a diamond.

LABOR IN THE NATIONAL CABINET.—There is talk of introducing a bill in the House of Representatives, creating a new department of government, to be known as the Department of Labor, the head of which shall be a Cabinet officer. A proposed feature is the requiring of sworn statements from employers, covering the wages paid by them and the profit realized on capital invested. It is possible that such a department might do useful work, but the clause requiring the disclosing of business affairs is too inquisitorial in its nature to be tolerated in this country. Employes as well as employers would object to officious meddling of this kind. This clause will have to be eliminated before there is any prospect of the passage of the bill.

GLASS FLOORING.—The substitution of glass flooring for boards continues to increase in Paris, this being especially the case in those business structures in which the cellars are used as offices. At the headquarters of the Credit Lyonnais, the whole of the ground is paved with large squares of roughened glass, imbedded in a strong iron frame, and in the cellars beneath there is sufficient light, even on dull days, to enable clerks to work without gas. The large central hall at the offices of the Comptoir d'Escompte has also been provided with this kind of flooring, and it is said that, although its prime cost is considerably greater than that of boards, glass is, in the long run, far cheaper, owing to its almost unlimited durability.

CEMENTING IRON RAILING TOPS.—A correspondent of the English Mechanic says that he used the following recipe with the greatest success for the cementing of iron railing tops, iron grating to stoves, etc., and with such effect as to resist the blows of a sledge hammer: Take equal parts of sulphur and white lead with about a sixth of borax; incorporate the three so as to form a homogeneous mass. When going to apply it, wet it with a strong sulphuric acid and place a thin layer of it between the two pieces of iron, which should then be pressed together. In five days it will be perfectly dry, all traces of the cement having vanished, and the iron will have the appearance of having been welded together.

A NEW style of paving block is composed of a hollow iron shell filled with any desired concrete, the shells being arched underneath, and for street paving are four inches wide and from ten to twelve inches long.

GOOD HEALTH.

A "House Epidemic" of Pneumonia.

Dr. Fr. Rudberg gives a brief account in the *Etica* of an epidemic of pneumonia occurring at the end of last year in a workmen's barrack at Sandarne, near Soderhamn, in Sweden, where there are five of these barracks, situated in a row, a distance of a couple of hundred feet from one another on a piece of sandy soil near a pine wood. The epidemic was confined to one of these barracks, there being only a single case in the remaining four at the same time, and very few in the surrounding districts. This building was constructed of wood, and had 16 rooms arranged in two stories, there being a common porch to every two rooms. Each room was occupied by a separate family. The total number of inhabitants was 78, of whom 47 were over 15 years, and 31 under that age.

The first case occurred on November 16th, in a boy of eight; subsequent cases occurred on November 27, and December 4, 7, 11, 14, 16, 19 and 20th. Of these there were four males and five females, one girl and one boy being under 10, but all the rest between 20 and 40. Six cases occurred in the lower story, and three in the upper. The disease appeared to have no tendency to pass from one room to the adjoining one, or even to another one on the same story, and in no case was more than one inmate of a room affected; but one woman living at a distance, who occasionally visited some of those who had the disease, was attacked by it herself on December 14th. It should be stated that there was plenty of intercommunication among the families. The writer does not mention any of the clinical characters of the epidemic.

HUMAN HAIR.—An expert has been figuring out some facts about the human hair. When the hair is pulled from the head it may be observed that the end which was implanted in the scalp is larger than the hair itself. This is the bulb or root from which the hair grows. A hair is, in fact, a delicate tube, round in straight haired persons and flattened in the curly-haired. It is the flatness of the hair which makes it curl. Women have coarser hair than men. The average number of hairs on the head is about 120,000. This calculation is based upon the ascertained fact that a square inch of the head of a person who has an average head of hair contains by actual count 1000 hairs approximately. In early days the kings of France used to pluck a single hair from the head and bestow it upon one of their attendants as a token of favor. The hair grows from eight

to ten inches a year. It has been found that it grows faster in summer than in winter. Light and sun evidently have an influence on the growth of the hair as on other vegetable products.

THE THIN YANKEE.—Americans incline to emaciation. A thin Yankee worries and asks what he shall do. First, be thankful you are not fat. Man's body is for use. Lean, flexible folks should be grateful that they do not waddle and wheeze. Besides, your chance for long life is better than a fat man's. But you need a certain quantity of fat, and I will prescribe for you. You probably eat too much, and hurt your digestion. It is not food swallowed, but food well digested that produces flesh. If your digestion is shaky, shun pie, cake, pudding, sweetmeats, all desserts, and confine yourself to beef and mutton, with graham bread, potatoes, and other vegetables, eating of plain food less than your usual quantity. Now, you must observe and eat more or less as your case may require. It is very important that you should masticate your food thoroughly. Live in the open air much, for after the food is dissolved in the stomach, it must mingle with much oxygen in the lungs before it becomes a part of your body. Bad food with pure air will make good flesh faster than good food with impure air. On rising and on going to bed slap your stomach and bowels hard several times with the flats of your hands. Shun tea. Sleep fattens, so retire early, and don't hurry up in the morning. Our friend, the waddler, ought to sleep little, you much. A good prescription for him is:

"Keep your eyes open and your mouth shut," while a good one for you is:
"Keep your mouth open and your eyes shut."
—Dio Lewis.

CLEAN HANDS.—According to the fearful experiments of Dr. Forster, of the *Medical Gazette*, there is no such thing as the possibility of clean hands on anybody. Washed with soap and water, with carbolic acid, with all and any of the disinfectants in common use, our hands will still remain scientifically unclean, that is to say, that a preparation called sterilized gelatine, absolutely destitute of living organisms on being touched by the fingers thus washed and supposed to be clean, immediately develops living organisms acquired from the fingers. But if the hands are washed in a dilute solution of chlorhydrate of mercury, or corrosive sublimate, one part to one thousand parts of water, perfect cleanliness is attained, and no living organisms will be developed by the touch of the fingers. It is pitiful to think that we are really so palpably made of the dust of the earth; but it seems that we must endure it, since corrosive sublimate can hardly be made the adjunct of our daily toilets, and if it were, then the next time we shook hands, or took up a hook, or went into the street, we should but develop a fresh crop of micro-organisms. The fact is that these discoveries of science show us, if they do nothing else, how fearfully and wonderfully we are made, and, if we regard them seriously, there is nothing we could eat and nothing we could do which would not make death seem to hang imminent in the air. There is one refuge for the unscientific, and that is in whistling the whole matter down the wind, keeping clean to the best of belief, and thus taking care of one's self, letting the micro-organisms take care of themselves.—Harper.

DEATH CAUSED BY EATING DIRT.—A death recently occurred at Portland, Maine, from eating dirt. The two-year-old daughter of John Shannon, a teamster, early in the summer began to eat earth, for which she developed an inordinate appetite. Neither punishment nor kindness nor threats could break her of the habit, and even when confined to the house she would escape mud from other children's shoes and eat it. Three weeks ago the parents began the strictest watch, and the child was permitted to eat only wholesome food. Her appetite was good, yet she began to grow thin and a sort of jaundice set in. The child grew weaker and weaker until the morning when she died. The parents would not permit a post mortem, but it is the opinion of the physicians that the dirt eaten by the child clogged the hilarity ducts, and that this produced death. Cases of dirt-eating are not uncommon among children, and whenever observed, medical advice should be sought, as the taste is produced by a diseased state of the system, and the habit is a dangerous one.

UNHEALTHFULNESS OF OIL STOVES.—It is not generally known that coal oil and gasoline stoves rapidly vitiate the air of a room for breathing purposes by the development of large quantities of carbonic dioxide. How much longer must this continue before manufacturers of such goods will obviate this new danger by inventing some form of hood and pipe for conveying this poisonous gas to the outside atmosphere? Volumes have been written concerning the ventilation of homes, and the injury that arises, especially to children and the infirm, from crowding too many people together in closed apartments, and now, with the introduction of oil and gasoline stoves in the household, a new difficulty presents itself which is not easily remedied in the endeavor to provide for health and comfort. These stoves are frequently found with several large burners in full blast, in small kitchens, hardly large enough to contain air to supply the healthful requirements of one person.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CLEANUP.—Amador Ledger, Feb. 20: The last cleanup at the Gover mine was an improvement upon the preceding one. The 20-stamp mill disposed of from 35 to 40 tons a day. Sulphurets are still being hauled from the Amador Queen mill to the sulphurets works at Sutter Creek. When the work of hauling commenced there was several hundred tons of sulphurets on hand. They are largely mixed with sand, however. R. C. Downs has been in Volcano during the past week preparing for the starting up of the Downs mine early in the spring. At the Kennedy the water has been reduced below the 700 foot level, leaving only 100 feet of water to be taken out. It is thought that two weeks more work will reach the bottom of the shaft, which is over 800 feet deep. The ten-stamp mill of the Potosi was started two weeks ago by Jos. Carrara, on rock from the North California tunnel. We are informed that, judging from indications, the yield is likely to be very gratifying. The new-fangled concentrator at the Moore mine is not a success. It is to be pitched out, and buddles substituted in its place.

WEST POINT NOTES.—It might not be amiss to mention a few facts regarding this district. It is situated about a mile from the Amador county line, at an elevation of 2,500 feet above the sea. The extremes of climate here are not of sufficient severity to interfere with mining operations during the winter season. We are located in the timber belt, hence we are amply supplied with wood and lumber, which greatly facilitates mining and curtails expenses. The extent of the mineral is five miles in width by the same in length. A portion extends into Amador county, where may be found some valuable ledges, from which many thousands have been extracted. Perhaps two hundred mines have been found here but out of all of these there are about five that can be made to pay dividends with proper management. The principal mine is the Consolidated Lone Star & Reed and Hillary, but owing to partnership complications it is laying idle at present. There are 1,000 tons of second-class ore on the dump, that will average \$10 per ton, and a series of chutes from 50 to 100 feet in length and from 1 foot to 25 feet in width, every portion of the workings are in plain sight and open to inspection. Every ton of ore in the Lone Star mountain will probably pay \$10 per ton by milling.

SUTTER CREEK.—Amador Ledger, Feb. 20: Teams have commenced in earnest hauling wood to the Mahoney mine. There are three teams hauling steadily, and if the weather continues fine for a few days longer there will be enough wood on the ground to make it safe for them to commence taking out water. There is an immense amount of water to be taken out, as both the Lincoln and the Wildman have to be drained to a considerable depth. In all probability it will take at least a couple of months to get to the bottom of the shaft. R. B. Symington, a gentleman from San Francisco, who has been appointed to look after the Amador Consolidated mine, came up on that mission last week. He remained only a day or two. He expects to make frequent visits here in the interest of the company. Teams are busily engaged hauling wood to this mine also.

Calaveras.

GRAVEL.—Mt. Echo, Feb. 20: The celebrated gravel mine, situated at Monarchville, about three miles northeast of this town, and known as the Jack Rabbit mine, is yielding large quantities of the precious metal. The shaft is about one hundred feet deep, and the pay gravel is six or seven feet in depth. Numerous quartz localities have been made in the neighborhood of Angels recently, and prospecting is going on vigorously on all sides. A quartz "boom" in the spring is inevitable. Success to the energetic and ambitious prospector. It is currently reported and generally believed that the Lindsay mine has been sold to London capitalists for a large sum of money. This mine is situated about one-half mile west of Angels, and was discovered twenty odd years ago. Several immensely rich deposits have been extracted from it within the past fifteen years. It has heretofore been believed that it was only what is generally termed a pocket mine, but recent developments have demonstrated the fact that the mine contains a large body of good milling ore.

El Dorado.

THE HERMITAGE.—Placerville Republican, Feb. 20: The Hermitage mine, better known as the old Sugar Loaf mine, near Nashville, is being informed by reliable mining men, to be started up soon. The mine once the property of Mason & Ryan, is now in the hands of Dr. Smith of Plymouth. Work on the mine is necessarily delayed pending final arrangements regarding the purchase of the property. When these matters are fixed, as no doubt they will be in a short time, the mine will be started up again, and the erection of a mill commenced at once.

TEST OF ORE.—Georgetown Gazette, Feb. 20: Dr. Spencer is busy making a test of a lot of ore in the Eureka null of this place, taken from his mine within half a mile of the mill, just east of town. Sanford Hansen is assisting the doctor and his boys in the null, and judging from the quantity of amalgam piling up on the plates, the ore is turning out well. In fact, so encouraging is the apparent result, that new locations are being made on the lode.

PYRAMID MINE.—We have information from a perfectly reliable source that there is a good prospect for the Pyramid mine being started up soon. The mine has been idle for a long number of years, much to the detriment of the owners and the country. It is now bonded to a wealthy mining syndicate of Glasgow, Scotland, for \$30,000. The terms of the bond are that if the ore runs \$3.75 per ton, \$30,000 will be paid for the mine, and for every dollar over \$4 per ton that the ore runs, \$5000 additional will be paid. It is also the intention of the purchasing company, in case the run turns out satisfactory, to immediately commence the construction of a 40-stamp mill together with works for the reduction of sulphurets, with which the ore is rich. The ore is of low grade, but of immense body, and a large num-

ber of stamps can be run to advantage. It is situated at the junction of the Coloma with the Folsom road, about one mile this side of Gray's Flat, in a good mining locality. It is one of those mines which will do for permanent investment, with sure and regular dividends. There are many such in El Dorado county, and the sooner they are developed and disposed of to those having the capital to properly operate them the better for the county.

Mono.

BENTON NOTES.—Inyo Register, Feb. 18: The favorable opening of the mining outlook for the chlorides on Blind Springs Hill for 1886, continues to improve, and there is every indication that the production of ore will be materially increased over that of 1885, but it may be as well to avoid unnecessary prophesying, until results speak for themselves. A great deal of steady and persistent prospecting and mining has been going on during the winter months, and though every one cannot be successful, the prosperity of a few always helps out and gives renewed confidence to others. W. H. Russell intends starting up the Montgomery mill this week, and W. J. Hosking has gone up to put things in order for another run.

Monterey.

AN EXCITEMENT.—Salinas Index, Feb. 20: Profound excitement prevails amongst a certain few of the citizens here in Soledad over their alleged discovery of gold and silver in vast quantities. The mine seems to have been discovered by a Mr. Melville, a resident of this town, who has divided his attention for several years past between farming and mining, or rather prospecting, his mining of late being the partial development of a copper mine over beyond but near the Palisades, and at the same time keeping his eyes peeled for gold or silver. The date of this last and wonderful find we don't know. It is located up the gulch which starts near Carnahan's ranch house some three miles to the east of Chalona Flat, and runs right back to the hills. It is reported that a strip of country four miles in length has the same gold-bearing appearance. Specimens of the silver ore have been displayed around town but some experienced miners who live here state the ore does not have the same color they supposed silver ore always bore, but brighter. A mining company has been formed and a young man by the name of F. D. Wood elected recorder of the district. This excitement revives instances of long ago of some prospecting done in the same locality. Outside of the few who represent the company the people have no faith in this great ado and pass it by as a bubble.

NEW GOLD MINES.—Cor. Monterey Democrat, Feb. 20: I have prospected Monterey county for the last 12 years for mines and most of my labor has been spent in the old Chalone mining district and at last I have struck a ledge. The top croppings show for three miles, and the ledge is seven feet wide and assays show from top rock \$7.44 per ton, gold and silver. I have sunk five feet on the ledge and have taken out some very rich rock. To-day we organize a mining district at the residence of Mr. Thos. Nixon, to make laws and elect a recorder. We have laid out a township to be known as Silver City, but these mines are to be known as the Black Ruby Ledge, situated six miles southeast of Soledad.

Placer.

MINING AT TODD'S VALLEY.—Argus, Feb. 18: There is not much doing in the way of mining at Todd's Valley at present. Most of the claims are lying idle, principally, we believe, on account of the litigation between C. T. Wheeler et al., of Sacramento, against Chas. Constable, assignee of the estate of the late A. A. Pond. The only mine of any note now operating is that known as the Mountain Tunnel, located on the old Todd place. Twelve or 14 men are employed there sinking a shaft, which is down 25 or 30 feet below the level of the main tunnel. This shaft is partly for the purpose of supplying better ventilation, partly to convey the water wherewith to run the machinery of the mine. The owners are San Francisco men. Ernest Garbey is the superintendent.

Shasta.

DEADWOOD.—Shasta Co. Democrat, Feb. 17: With the advancing spring the outlook for Deadwood for the coming season is exceedingly bright. The mild and open winter has not materially hindered prospecting. The Brown Bear mill has been shut down for the past few days for much-needed repairs, and will be ready to start in a few days. The mill has recently changed working hands, with two competent men at the throttle. There is an abundance of rich ore on the dump and plenty of the same kind in sight in the mine. The shipment of bullion for the coming season would no doubt make many a road-agent not hesitate to face the messenger's trusty shotgun. John Gibson has his arastras running on Blagrove's ore which yields a handsome profit. George Chenoweth has leased the Brown Bear mine from the Gibson Bros. If there is any pay rock in the mine George will find it. John Yule and Alec Campbell recently struck it rich in the Monte Cristo mine, leased from the Brown Bros. The Van Matre boys are also taking out good ore from their claims. Tom Greene and Balleau are prospecting on a ledge which shows up plenty of good ore. The Trinity Mining Co. has its mill and mine shut down for a few days. Franck & McDonald Bros. keep their mill running steady on good ore. The company intends running a long tunnel in the spring to tap their mine several hundred feet deeper, and perhaps put an addition of five more stamps the coming summer.

A WORKED OUT MINE.—Shasta Courier, Feb. 20: The old and well known Washington mine at French Gulch had, like a number of others, its ups and downs. Men who called themselves mining experts, but who were not, and others who wanted to gobble up this valuable property for a mere nominal figure, were free in pronouncing the mine worked out. But the owners had not lost faith in it, and persevered in spite of all reverses and drawbacks. A few months ago an experienced miner, Robert Stanley, took a lease of a portion of the mine, and in a short time he, with the aid of two more men, developed an astonishingly rich deposit of gold-bearing quartz. Last Thursday Mr. Stanley brought to the office of E. Lewin here, the result of 29 tons crushing, 103 ounces of retorted gold and a great number of specimens literally covered with free gold and gold-bearing sulphurets. He has ten tons more of this ore out, ready for the mill, and about twenty tons that he calls second class ore, and enough in

sight to make several more such runs before his lease expires. The ledge itself, showing well all along, is not touched, and this ore was merely taken from stringers leading to it, and found, in a substantial working tunnel, now in 100 feet, for the future development of the mine, which gives promise to become quite a bonanza for the owners and the lessee. All French Gulch rejoices over this streak of good luck to the Washington boys, and so do we.

Sierra.

A PROSPEROUS OUTLOOK.—Sierra Tribune, Feb. 20: George Abbe visited his quartz mine up Ladies' Canyon last Wednesday, and found that in each day's progress softer rock is encountered. He believes that it is now only a matter of a month or so when the ledge will be reached. Mr. Abbe and his associates have expended quite a large sum of money in the development of this claim, and they deserve success. There is but little doubt that the ledge they are running for will prove remunerative as the surface indications all point that way. Mr. Abbe says that some very rich specimens have been found at various times in the croppings. Lately a San Francisco party secured an interest in the mine. He is said to be very wealthy, and consequently abundantly able to bear his share of expense. It would not be surprising if the inspiring sound of the quartz mill was heard in this quarter by the time another winter shall have rolled around.

PORT WINE.—Cor. Mt. Messenger, Feb. 20: Most all of the miners are busy, while they have water to run their mines with, which, I fear, will not be but a short time, as it is failing very rapidly. Moor's claim at Bunker Hill has taken advantage of the water season, and stripped considerable ground which looks very favorable. The next we come to is Liberty & Co., who are busily engaged with a small force of men. The next mine is Jas. Lewis & Co., who are working the school house ground, and have moved the building on the upper side of the road opposite to where it formerly stood. The Pilgrim Co., at American Hill, have struck the lower part of their ledge; 17 feet wide. It prospects well.

GOOD INDICATIONS.—The ledge which was recently struck in the Perry mine is widening and judging by a sample piece of the quartz shown us this week, the owners have cause to rejoice at the results already obtained. It is not unlikely that some kind of a stamp mill will be erected at the mine next summer. Many men believe that the Perry is a continuation of the Sierra Buttes lead. If this should prove true it would be a grand thing for Sierra City, as the mine is located within a stone's throw of the business center of the town.

INCREASED PROFIT.—According to all reports the erection of the chlorination works at the Sierra Buttes mine has proven a very profitable investment. It is said that the output of the mine has increased several thousand dollars per month since the process of saving and working the sulphurets was introduced. Previously the tailing from the mills were sold to parties who worked them by arastras and realized large profits, the company thus sustaining a direct loss.

FOREST CITY.—Forest City is a flourishing mining camp, and will probably continue to be for many years. The Ruby and the Bald Mountain Extension mines are doing well, and those, together with the Bald Mountain, give employment to many men. Business there is fairly good, and the people are contented and happy.

NOTES.—Charles Thompson has bonded his claim, located a couple of miles up the creek from Bassett's, to Watt Hughes for \$6,000, the bond to expire the 1st of June. Sam Hartley the other day picked up a seven-ounce gold nugget in his mining claim below town.

Siskiyou.

THE SUMMERVILLE HYDRAULIC.—Yreka Union, Feb. 18: The Summerville hydraulic mine in South Fork of Salmon district, owned by Messrs. Geo. Smith, R. H. Campbell and Geo. C. Spooner, is one of the most extensive and best equipped in Siskiyou county. The company last year constructed a four-mile ditch at an enormous expense, and are now so situated as to be favored with an inexhaustible supply of water the year round. They own their own sawmill and store, and employ a large force of men. They are now in a fair way of receiving their reward for their energy and enterprise. The cleanup for January amounted to \$6000, Mint figures, and the outlook for this month is fully as good, but March will be better, as the weather will be more favorable. The company own more ground than can be worked in the next twenty years, and as far as can be ascertained from careful prospecting the gold is distributed uniformly throughout the entire claim.

Trinity.

DEADWOOD.—Cor. Trinity Journal, Feb. 20: Deadwood with its arastras, mills, mines, monuments and towers is still here. Active prospecting is now being done, and most all of the old prospects undergoing development are proving extensive and valuable. Francis Balleau has one of the most promising ledges in the district. Quartz is being taken out in abundance, in which can be seen free gold diffused in large quantities through the rock. The ledge averages three feet between walls and consists of the solid quartz itself. A mill will be erected on the mine early in the spring. Van Matre Bros. are at present doing their share at development to Deadwood by pushing their mine actively ahead with prospects never more exciting. Messrs. Lamb, Hopkins & Co. have struck their lode in their tunnel which looks to be in a prosperous condition. Jeff Brown & Co. on Thorn Gulch (a fork of Deadwood) has employed a few more men in their mine and will hereafter run two shifts. All the older mines are in blooming circumstances and keep well up in the old time standard.

Tudumne.

SUMMERVILLE NOTES.—Tudumne Independent, Feb. 20: The Louisiana mine will start up in the near future. This is a good mine, but unfortunately it has always been poorly managed. We hope that under the new administration it may prosper and become one of the leading mines in the county. Clark and Brown have commenced the erection of a quartz mill, at a point about half-way between Cherokee and Summerville. Steam power will be employed to run the mill, and it will contain sufficient stamps to crush ore extracted from a four-foot vein. Mr. P. Easton is constructing hoisting works on his mine at Arastraville. We are informed that his mine is looking well. We wish our aged friend

all the gains and none of the losses to which quartz miners are at times subjected.

NEVADA.

Washoe District.

CHOLLAR.—Virginia Enterprise, Feb. 20: The main lateral drift south on the 3100 level of the Chollar mine having been put in complete order throughout, with covered drain boxes to carry off all the water encountered, drifting south was resumed day before yesterday. It will be remembered that when this drift was stopped, about a month ago, its face was within a few feet of the Potosi north line, where quite a strong flow of water was encountered. The drain boxes carry this to the Combination shaft, where the Cornish pump lifts it to the Suto tunnel, consequently unless a very much increased flow of water is encountered this drift will now be pushed onward through the Potosi ground, a distance of 700 feet, to the Baulion ground. When this is done the natural result will be the sinking of the Ward, or Baulion Combination shaft 700 feet deeper to the required level to meet and connect with this drift, forming a very desirable and much-needed connection for ventilation and development purposes. This drift has been run thus far in the footwall of the ledge—on the west side—and the ground being of a favorable nature excellent progress is being made. The face of the drift is passing the line into Potosi ground and developments in that direction will be watched with eager interest, for it will pass into and through a large block of virgin ground—unexplored territory—in which there is plenty of room for as large bonanzas as those of Crown Point and Consolidated Virginia.

CON. CALIFORNIA AND VIRGINIA.—About 400 tons is now the daily yield of this mine, which is reduced at the Morgan and Eureka mills on Carson river. The average assays given from the mill batteries is between \$14 and \$15 per ton. About \$40,000 worth of bullion was shipped to San Francisco last evening. The main drift west from the C. and C. shaft into the 1950 level has been put in thorough repair with a view to practical explorations in that section. On the 1650 level the drift northwest is in 60 feet and steadily being advanced. On the 1400 level the exploration drift has been changed to a southwest course and was advanced over 60 feet during the past week.

HALE AND NORCROSS.—The deep winze below the 3000 level has reached a point over 20 feet below the 3200 level, and is still being continued downward, the ground being dry and very favorable. Orders will probably be received to-day, or very soon, to discontinue sinking, and open a station on the 3200 level for a lateral drift south to connect with the Combination shaft, which has been sunk to that level, or north to explore and develop the rich prospects obtained to the northeast near the Savage line. A few men have been employed during the last week or two in the upraise, above the head of the deep winze on the 3000 level, extracting some very good ore. This upraise is to be continued to the 2900 level.

OPHIR.—The west drift from the old Mexican shaft, on the 300 level, has been extended 33 feet, making a total length of 185 feet. On the 400 level the north lateral drift from the west drift from the old Mexican shaft has been retimbered and put in good working order. A west crosscut from this drift was started a few days ago, and is now in 48 feet, showing favorable-looking vein matter with streaks and bunches of low grade ore. On the 700 level the joint Mexican and Union drift being run in connection with this mine, and running northwest through the Ophir ground, is in 36 feet having been extended 39 feet during the past week.

GOULD AND CURRY.—Draining the Osbiston shaft of this mine and the Best and Belcher is steadily progressing. The pumps work well and the water is reduced nearly to the 2100 level. Unless something unfavorable should occur they expect to connect with the third line of pumps at that point about the first of March. As the water gets more lowered, progress is necessarily slower, owing to the greater extent and depth of water belt to be drained. The work is being very actively and efficiently prosecuted.

YELLOW JACKET.—Daily yield 115 tons from the old upper levels, which is reduced at the Brunswick mill. Judicious exploration work is being carried forward in various parts of the mine with a view to future production. The old ore breasts and stopes however, continue yielding well, although the ore is of a very unremuneratively low grade.

CROWN POINT AND BELCHER.—The daily output of ore continues to be about 350 tons, a large proportion of which comes from the 1600 and 1700 levels. Some very good stopes of ore are being worked between those levels and above, which yield better under the stamps than the low-grade ore from the old upper workings.

SIERRA NEVADA.—The main north lateral drift on the 520 level is now in 1819 feet, 62 having been added during the week. Material, dry vein porphyry with very little quartz or clay.

ALTA.—The lateral drift north towards the Berton ground continues its good rate of progress, also its favorable developments of low-grade ore stringers.

UNION CONSOLIDATED.—Lateral drift No. 2 north has been extended 43 feet, making a total of 123 feet. Material, vein porphyry, clay and a little decomposed quartz.

MEXICAN.—The explorations on the 500 level are actively continued in promising vein matter.

KENTUCK.—Enough ore is being extracted to keep the Rock Point mill supplied.

Bell District.

ORE.—Belmont Courier, Feb. 18: Ernst & Esser will soon make a shipment of ore from their mines in Bell district; as work progresses the property continues to increase in value and the owners are well satisfied with the results as far as they have gone.

Clark District.

NEW DISCOVERIES.—Eureka Sentinel, Feb. 20: Charley Burlingame came in yesterday morning from Clark mining district, where new discoveries of a promising character were made some ten days ago. The recent finds are about 13 miles west of town, near Nickals' ranch, and are about six miles north of the old Spring Valley district that created considerable talk and excitement several years ago. Mr. Burlingame brought in with him a number of sam-

ples of ore that he took out of the shaft of one of his properties from the surface down to a depth of six feet. All of them are of a promising character, and two or three will, no doubt, assay well. The formation is limestone and quartz carrying galena. He says half a dozen or ten men are there hard at work, and already a large number of claims have been located. He expects to return in a few days.

Columbus District.

HOLMES.—Candlemas True Future, Feb. 20: We are getting the stope above the 5th well started and it looks well and we think it will be just as productive as at any point below. In places it is very large and the ore is good milling. It is a very large body of ore, and there is but little doubt that it will go to the surface. We are working in the McCuen ledge, near the old 7th, where we have a streak of ore that is 18 inches wide. It is 40 feet long, looks well and assays well. The stope 60 feet below the Morris drift looks just the same. It is 170 feet long and will average fully 4½ feet wide. The ore is good milling and all goes to the mill as it comes down. There are places in this stope where the ore is 15 feet wide. This is as large a body of ore as was ever worked in this mine. This ledge is north of and parallel with the east and west ore bodies that have been worked near the foot wall, and no work has ever been done in it except what has been done by the Holmes Co. The ore bodies worked in the mine have generally extended to great depths. This one has been worked in from 20 feet above the 5th down to the 8th level. We have been running a drift from main level to cut this ore body and during the past week we cut what we think is the west end of the Morris ore body on this level. We cut it 50 feet further west than we expected to, the ore and the ground it is in looks exactly like the Morris ground and ledge. If it proves to be the Morris it will be larger on the 10th than it is on the 8th, in which case it will be a larger ore body than any ever worked in the mine.

GENERAL GRANT.—Work on this claim is progressing favorably. Mr. Dunlap has the chamber cut out on the ledge in the tunnel and is sinking as fast as possible. The ore improves as he goes down.

GOOD WEATHER.—The boys are taking advantage of the fine weather. There are about 30 of them working on their own claims, and some of them have very fine prospects.

SILVER BOY.—Several parties have visited the mine of late with a view of purchasing. There are several fine specimens to be seen at this office.

Eureka District.

THE OUTLOOK.—Eureka Sentinel, Feb. 17: The Sentinel believes a better era will shortly dawn on Eureka. Preliminary steps have been taken for the inauguration of work which will materially aid in determining the value of many of the principal mines of the district below water level. While most of these properties immediately about us are what might be termed "virgin," the two—and the only two that have been worked systematically and energetically, namely, the Eureka Con. and Richmond—have no doubt yielded up the bulk of their wealth that existed above the flooded levels. The amounts that each of these properties have, disbursed to stockholders are up in the millions, and most of those who profited by this wealth, especially that produced by the Eureka Con., still hold to their property with the faith and zeal of those who are slow to let go of a good friend. The preliminary work to which we refer was decided on the other day by the Eureka Con. Company. A contract was let by them for a 20x60 direct-acting hoisting engine, similar to ones successfully in use on the Comstock, and having a hoisting capacity of at least 200 gallons per minute. It has yet to be constructed, but from what we have been able to learn, it must be ready for delivery within 90 days. Just as soon as it is placed in position, the work of draining the mine and sinking the shaft to a greater depth will be commenced. Many of us know what the Eureka Con.'s upper levels have demonstrated, and we know, too, a like formation exists in probably 20 of the 50 or 60 producing properties of the district. What there is below the water levels of these properties is a matter of some conjecture. That when shown, will, in no small degree, decide the permanency of the town. Firmly believing that it will result in the unearthing of large bodies of ore of a valuable character, the Sentinel hails the projected work with joy, knowing that it will, locally, be a common good. Until the desired result is known we have the knowledge that among those acquainted with the ground, and who are well versed in mining, especially in limestone formations, the theory and belief is common that the principal wealth of Ruby Hill and Prospect Mountain especially can be obtained only by such operations at depth as have just been inaugurated.

Esmeralda District.

AURORA.—Virginia Enterprise, Feb. 19: The Aurora boom seems to have moderated considerably, only about two dozen men being employed there at present. Many who rushed thither on the strength of the story that the mines had been sold to an English syndicate of heavy capitalists who intended working them for all they were worth, are getting out of there again. The Blasdel group of mines are merely bonded to the parties in question, who will purchase in case the returns of a few tons of ore now being extracted for shipment to London should prove satisfactory.

Jackson District.

MEN AT WORK.—Silver State, Feb. 20: There are some 35 or 40 men at work in the district, and the prospects are that the population will be quadrupled in a few months. The mill is rapidly approaching completion, and as there is no doubt of the permanency of the camp the miners think they should have a weekly mail.

ARIZONA.

TOMBSTONE.—Democrat, Feb. 20: Since the water-level was reached in the mines of Tombstone, more than two years ago, the bullion output of the district has been materially lessened and a feeling of uncertainty and suspense has prevailed among the property-owners of the camp. Reaching the water-level is always regarded as an important epoch in the history of any mining camp. The character and grade of the ore often changes at that point, and not infrequently the productiveness of the ledge disappears altogether when the water-level is passed; and then at times the volume of water encountered proves too great to be controlled by all the appli-

ces of modern mining machinery. Hence, it is not surprising that the feeling of insecurity or lack of confidence before referred to should prevail in Tombstone pending a solution of these important questions. But the Democrat, confidently asserts that the crucial test from which the camp is just emerging has been prolific in satisfactory results. Previous to the breaking of the Grand Central pump-rod in December last, it had been conclusively demonstrated that the water was easily controlled by the machinery now in place at the mines. The continuity and increased richness of the ore bodies below water level was also proven. These questions so vital to the prosperity of the camp having been satisfactorily settled, an era of greatly increased activity in mining matters may be confidently anticipated. Outside mining operators are regaining confidence, and as a result the ensuing season will witness the expenditure of many thousands of dollars in the development of claims that have long remained untouched. Appended is a partial resume of present operations in the district.

TOMBSTONE MILL AND MINING CO.—This company is perhaps doing more work at present than any other company in the camp. The Girard mill is pounding away night and day, at the rate of 2000 tons per month. Most of this ore is being taken from the old reliable Toughnut, although work is being done on the East Side, West Side, Lucky Cuss, Luck Sure and half a dozen other claims owned by the company. The concentrator and smelter at Charleston are still working the tailings beds at that place. Superintendent Cheyney informed the reporter that he could easily furnish ore from the several claims being worked to run three times the number of stamps in the Girard mill. Including those at Charleston, the company employs 180 men.

STATE OF MAINE.—This property, situated about half a mile west of the Randolph, is owned by Charles Leach. It has been worked continuously for more than four years, and during that time a vast amount of work has been done. The main incline is down 520 feet, at which point water was reached and further sinking prevented. Twenty-five men are at present employed, and 40 tons of ore are shipped monthly to Pueblo. The fact that these shipments pay the entire running expenses of the mine gives some idea of the richness of the ore. The 3 N., an adjoining claim, also owned by Mr. Leach, is being worked and considerable rich ore extracted. The main shaft is down over 100 feet.

LEASED.—Mohave Co. Miner, Feb. 12: Tom Steen has leased the old Mayflower mine on the hill opposite the Miner office, and will very shortly go to work on it. Some very good ore has been taken out of this mine in former days, and Tom is hopeful of finding some more of the same kind. Thomas Roberts returned from Kingman on Monday, where he had been to dispose of a load of ore from the Retort mine. His ore sampled 538 ounces in silver, and nearly two ounces of gold per ton. This is what might be termed a very fair grade of ore, but we have plenty of this kind in Mohave county. Ed. Thompson has bought out the interest of Ed. Cook in the Golconda mine, near Todd Basin.

GRAND CENTRAL.—The new pump-rods arrived this week. The work of putting them in place has not yet been begun, owing to the non-arrival of the steel coupling plates. Foreman Leach informed the reporter that within 30 days after the arrival of the plates the pump will once more be in operation. The pumps have been closed down nearly two months, and the water in the mine lacks 23 feet of having regained its original level. For the past three weeks it has raised at the rate of 14 inches per week. Forty tons of good milling ore, from above the 400 level, are being raised and sent to the company's mill daily.

PROMPTER.—The tedious litigation which has been in progress over this property for a year and a half has been happily settled, the Chicago stockholders having obtained complete control. Superintendent W. H. Ferry informs the Democrat that it is the intention of the company to thoroughly prospect the property. Seven men are now at work, and others will be put on as soon as their services can be utilized. When the most favorable point for sinking has been decided upon, a new shaft will be begun and continued down indefinitely, or as long as there is a reasonable prospect of striking an ore body.

EMERALD.—Since this mine became the property of the Grand Central Company, not less than \$100,000 has been expended in development work. The main shaft is down a short distance below the 600 level. They are drifting both ways on the ledge from the 600 level, and have two feet of 40 ounce ore. Drifts from the 500 level are also in good ore. The daily output of ore has in the past been 20 tons.

LITTLE GIANT.—This promising property, situated about half a mile southwest of the Emerald, is owned by Judge J. S. Robinson. Main shaft is down 160 feet, the bottom of which is in good ore. The ore is sorted and the richest shipped to Pueblo. The lowest return yet received was 220 ounces to the ton. Seven men are at present employed.

THE CHLORIDERS.—Doc Ryder and J. C. Swayzee have secured a lease on some ground belonging to the Rattlesnake. They are taking out some very rich ore, and will soon make a shipment. The chloriders in the vicinity of the Merrimac are gathering in some rock which will go up in the hundreds.

COLORADO.

GEORGETOWN NOTES.—Courier, Feb. 18: Bonqvist & Co., lessees on the Bullion lode, East Argentine, made a shipment of ore from their workings this week. The board of managers of the Colorado United Mining Company contemplate disposing of some of their mining property. Wm. H. Butler, who is working the Muscovite lode on Democrat mountain, shipped about three tons of heavy galena ore a few days ago. C. T. Gleason, lessee on the Independence lode, had a millrun of 3930 pounds of ore last Tuesday, which yielded 217 ozs. silver to the ton in one class. Peterson & Co., lessees on the Johnson lode, East Argentine district, made a shipment this week of about a ton and a half of ore, which milled about \$100 to the ton. Martin Kapsch & Co., lessees on the Colorado mine, have a vein of mineralized quartz ranging from four to six inches in thickness. Cook & Co., lessees on the Maine mine, had a \$1500 millrun last Saturday. The first class returned 354 ounces silver and 50 per cent lead, and the second class 120 ounces silver per ton. Partic-

ularly interested in the Pulaski mine are contemplating renting the Silver Plume mill, which will be used in concentrating ores from that mine. Immense bodies of concentrating material are exposed. A shipment of about ten tons of ore was made from the Centennial mine this week. Drifting and stoping is progressing on this lode. A two-foot vein of lead ore is opened on the 50-foot level, and four feet of iron pyrites are shown on the 100-foot level. The working lode on Brown mountain, near the 7-30 mine, is being worked under lease by Stanley, Ryan & Co. The developments show a shaft 40 feet deep, from which a drift has been run in a westerly direction 100 feet, and is still being pushed ahead. The breasts shows a vein of solid ore from three to four inches in thickness, while in the shaft, which is still being sunk, is exposed nearly two inches of ore, which returns \$173 to the ton, according to the last mill-run.

UTE CREEK.—The 100-foot level east on the Argosia is being driven ahead on mineral which mills about \$200 in gold and silver. The Bald Eagle is being worked by several sets of lessees with good results. The Argosia is being worked by Depeu & Co., under bond and lease. The main shaft, which is down about 60 feet, is being sunk on six inches of solid ore, which mills from \$200 to \$400 a ton in gold and silver. An engine and hoisting rig has been purchased, and will soon be placed in position. A tunnel is being driven to open up the Mattoon lode, which is in 100 feet and near the point of intersection.

IDAHO.

OWYHEE.—Silver City Avalanche, Feb. 16: The War Eagle mill whistles blew on Monday, the stream was turned into the cylinder, the wheels moved and the stamps commenced dropping on Potosi ore. Everything worked to a charm, and Mr. McGregor was there to see that it did. Mr. Keyes is the amalgamator, and is said to understand his business, having had great experience in Nevada in milling the ores peculiar to the mines of that State. There were a hundred tons of ore to run through from the Potosi, and it is expected that as much more will be hauled from the Black Jack. Mr. Mr. C. D. Peck has struck a very rich chimney of ore on the Oso. The body pitches south into War Eagle mountain and was found in running the drift south. The lode is well situated for working and good backs can be had by continuing the drift on the lode. The raise being made in the Little Giant and the drift now going north on it are in splendid ore, which carries gold visible to the naked eye. The distance from where the crosscut struck the lode to the surface is 160 feet. The drift will be continued north and the lode properly opened for extracting ore. That now being extracted is sacked. The lessees of the Empire lode have struck a rich body of ore in the third level of that mine. It carries both gold and silver, but gold predominates. It is where the rich stringer worked by the Terrill Brothers several years ago comes into the main lode. It is not known how extensive the ore body is, but so far as it has been run on it shows up splendidly and will turn out well when it is milled. We understand that Mr. Simon Harris and Frank Nichols have encountered a very rich chute of ore in the Minnesota and Chariot mine. The ore now being extracted is covered with gold and silver.

MONTANA.

DRUM-LUMMON.—Inter-Mountain, Feb. 17: The mine is opened by two tunnels. The upper one is about 230 feet long and connects with a shaft on the vein, 100 feet deep, from the bottom of which levels have been driven each way along the ledge, and most of the ore above them has been stoped out. The greater part of this work was done by Mr. Cruise, the original owner of the mine, before it was sold to the Montana company (limited) of London. The ore at this point reached a width of 60 feet. The company went lower down the mountain, and ran a tunnel called the Maskeline which cut the vein at a depth of 450 feet, from which levels have been run. The two tunnels have been connected by "raising" on the vein, and two levels have been run southwest above the lower levels. The main drift from the Maskeline tunnel running southwest, first passed through a chute of ore on the hanging wall 120 feet long, and the same ore chimney was found in the upper levels. The pay streak is from 4 to 12 feet wide, and mills about 50 per ton in gold and silver. Some stoping has been done above the lower level, but fully two-thirds of the ore between that and the upper tunnel remains standing. Next came 250 feet of nearly barren ground, which was followed by another ore chute that in parts shows a width of 30 feet. It is free milling, and yields \$33½ gold per ton. All the upper levels are in this pocket at present and one of them has been in ore for over 100 feet. On the northeast side of the tunnel a barren streak about 120 feet long was first encountered; then a chute of ore of about the same length, consisting of milling and shipping ore; the former carrying from 50 to 150 ounces per ton, and the latter 300 ounces and upwards. They have stoped a little on this chimney. Northeast of this was another barren zone, 150 feet long, followed by about 100 feet of the best ore they have yet found in the mine. The shipping ore contained by earload lots from \$350 to \$540 per ton in gold and silver, and the milling ore yields from \$700 to \$750. The level next passed through 25 feet of poor ground; but the heading is now in another mass of ore, nearly 100 feet wide. The last ore chute contains a great deal of silver chloride, and is the freest ore yet met with, yielding up yards of 100 ounces per ton.

NEW MEXICO.

SOCORRO DISTRICT.—Socorro Bulletin, Feb. 20: The average assay value of the Morning Star ore body in the 118 foot shaft, amounts to 55 oz. silver and \$3 gold. The Torrence is working steadily and the mineral is being dumped with a view to treatment at the M. & M. Co.'s mill and the Billing works in this city. Messrs. Purdy and Bennett, now in the city from Pierce City, Mo., are prominent members of the Dempster Mining Company, operating in the Black Range, which owns the German, Green Cap, James Henry and Hancock claims, all of which have dumps of pay ore, and the company have decided in the near future, after carefully weighing the question, to erect a concentrating plant in that range. Our reporter visited the Graphic M. & S. Co.'s plant of this city on Tuesday, and ascer-

tained that the ore under treatment is still drawn mostly from the Greyhound and Graphic mines of the Magdalena district. One stack is in continuous operation, and the other will blow in to-morrow.

WATER CANYON DISTRICT.—Maher & Dahl are actively engaged in mining operations on their important properties. Col. Wm. Roy and H. May have completed their assessments for the present year on the Logan claim, and they have an important body of quartz-bearing gold, silver and galena. Assessment work for 1886 has been completed on the Annie Z., and Mr. Ziegler, the owner, has succeeded in intersecting a small, continuous, but exceedingly high-grade argentiferous copper vein. Haase, Ott & Co. notified the owners of the Jane Bowman that they wish to continue their lease for another year, and state that they are preparing to erect a large concentrator plant in Water canyon. Steady work continues to be the order of the day in the tunnels and open cuts of the Stem Winder, of which Martin Joyce is the owner. The ore afforded by this property consists of argentiferous galena, in quartz and spar matrix. Judge Posey and John Dobbins are blasting steadily in the Wall Street, and dumping copper ore, as well as high-grade argentiferous galena, a body of which they recently intersected in a continuous vein of lively looking quartz.

MAGDALENA DISTRICT.—The recent work on the Graphic has disclosed an extraordinary body of ore, both in quantity and value. The Eaton concentrator is in movement and successfully turning out concentrates which are shipped to the Billing smelter of this city. The Silver Bell is the scene of continued and intelligent work, and its pay mineral is steadily increasing the dimensions of its ore dump. The strike made in the Jos. Cowen claim of the Magdalena district by James Stephens some days ago has attracted no little attention. It is an additional proof that much yet remains to be done by active and intelligent prospectors in our oldest camps. Mr. Stephens discovered and located the Cowen on the 1st of January last, after a few feet of work reached an important and valuable body of argentiferous copper ore.

PUEBLO DISTRICT.—Sinking continues in the South shaft on the Paraje mine. A full force of men are working on the Carnero mine, and ore is being dumped in a lively manner. Col. J. S. Hutchason is steadily developing his several properties and raising considerable pay silver, copper and galena ore. The Brittenstein M. & M. Co.'s mill started up on Saturday for a steady run, having placed in position their Frue Vanner and discarded the old-pattern concentrator.

MISCELLANEOUS.—Three cars were unloaded this week by Browne & Manzanares Co. They contained a 15-stamp mill destined for the White Oaks M. & M. Co., Lincoln county, of which Thomas J. Scott is the superintendent. It is a fine plant. Donald McRae is now superintending the working of his Lawrence mine in the Ladrona District, and is sacking a large quantity of pay mineral for shipment to Socorro for treatment.

OREGON.

QUARTZ AND GRAVEL.—Jacksonville Times, Feb. 19: Five men are at work on the quartz mill building in this place. Walker & Anderson are taking some rich ore out of their ledge on Applegate. Jas. B. Ivory and several others are now engaged in placer mining on Elliot creek. Higinbotham Bros. have discovered a very promising ledge in the Gold Hill district. Wm. Ruble of Cayote creek has two giants in full blast and is stripping off a large area of ground. Walsh & Bragdon are taking considerable ore of an excellent quality from their mines on Wagner creek. Walter Simmons has a large supply of water at his hydraulic mines in the Galice district and is making the most of it. Dugan & Herley, who have a quartz ledge west of town, have struck some very rich ore, and there seems to be plenty of it. R. B. Bannister of Uniontown precinct, who has been ground-slucing on his place, picked up a \$28 nugget a few days since. Lewis Hays and son are working A. H. Carson's mines in Josephine county and have stripped a large amount of bedrock with presumably good results. Most of the placer miners have already done more work this season than for the past two or three, which will ensure a good cleanup in case no timely rains fall. The discovery of a rich quartz ledge on M. Bickenbach's place near Woodville, is reported. The ore shows an abundance of free gold. Considerable excitement exists there in consequence. The pleasant weather has diminished the water in some instances, but most of the placer miners still have an ample supply. More rain may be expected in the near future, however. This is unquestionably the best season the placer miners have had for years, and we expect them to make a good cleanup in most instances, which will insure the circulation of a considerable amount of ready cash at the end of the season. Henry Wines of Jump-off Joe district, Josephine county, made a partial cleanup a few days since, which yielded nearly \$400. One nugget was worth \$45 and there were a few which weighed between \$20 and \$30 each. Mr. W. has a very rich claim.

BETTER OUTLOOK.—Baker City Democrat, Feb. 18: Encouraging proofs continue to come from the mining field as one result after another blossoms forth, which has cost years of toil and many dollars in money. The hard labor and faithful persistence which has been expended in so many unknown and unobserved portions of our vast mineral bearing territory is coming at last to the harvest and the outlook is certainly full of encouragement, even to those who have almost lost faith in the recompense coming in the slow and tedious march of events. The coming season, when all that has been accomplished is realized, will mark one of the most important epochs in the mining history of this country. Men will awake and find a new dispensation with the magnificent productive industry of mining established upon a new foundation, clean, solid, enduring—its requirements more generally understood, its real object clearly outlined and its possibilities better comprehended. Mining never yet has shown its best results and most valuable characteristics from the fact that they have not been sought in the line where they alone are to be found, but the marked improvement in satisfactory returns, shows that men from experience are learning wisdom and more nearly approaching the true line of successful operation.

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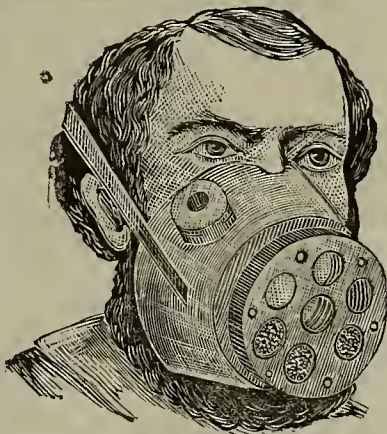
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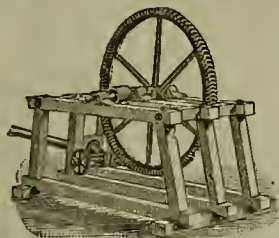
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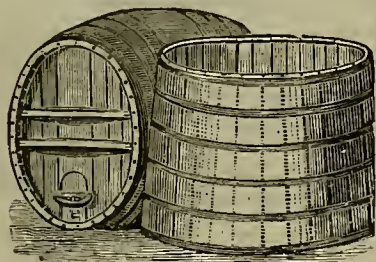
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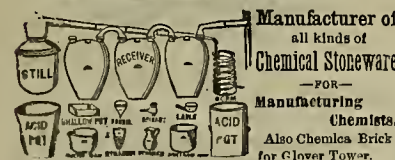
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Payne's Vertical and Horizontal Engines.
Otto Silent Gas Engines.
Clapp & Jones' Steam Fire Engines.
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FOR WEEK ENDING FEBRUARY 16, 1886.

336,077.—IRONING TABLE—Mattie J. Baker, Santa Rosa, Cal.

336,201.—SAW SETTING DEVICE—Dan'l Behmer, Santa Rosa, Cal.

336,376.—TEXTILE FIBERS FROM CACTI—J. C. Belk, Tombstone, A. T.

336,091.—CAR COUPLING—Coon, Hedges & Bernard, S. F.

336,515.—CHENILLE—J. Frellochr, S. F.

336,239.—HEATER FOR BARRELS, J. L. Koster, S. F.

336,347.—CAMPING CHEST—C. B. Rice, East Oakland, Cal.

336,493.—TICKET HOLDER—M. Rice, East Oakland, Cal.

336,174.—FAUCET—John Tilton, S. F.

336,180.—DRAFT POLE FOR VEHICLES—W. L. Walker, Brooks, Cal.

16,520.—DESIGN—J. M. Espinosa, S. F.

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Mining Share Market.

Mining stocks continue dull in this city. Some of the Comstock mines are doing well but their operations have not buoyed the market up at all. The Consolidated California and Virginia mine is turning out a large amount of ore as usual, but not of high grade, yet it ships a goodly amount of bullion occasionally. Crown Point and Belcher stand in on the same proposition and so does Yellow Jacket, the regular daily output of ore from the Comstock amounting to nearly or quite 1000 tons. Drifting south on the 3,100 level of the Chollar has been resumed. The face of the drift is now passing the line from the Chollar into the Potosi ground, and unless too much water or some other adverse circumstance interferes, this drift will be carried entirely through the Potosi—700 feet—into the Bullion mine. The Ward or Bullion Combination shaft can be sunk 700 feet deeper to meet it, in case it is extended through which it probably will be, and thus a fine circulation of air will be established, besides other advantages. Moreover this will be the first step toward the pumping out of the Gold Hill mines, as the 3,100 of the Hale and Norcross and Chollar, through the Potosi, will strike and drain the lowest depths of the Gold Hill group. All this, says the *Enterprise*, however, is not merely the matter of a few days or weeks, but months and perhaps a year or two. But the Gold Hill mines will be pumped out all the same, inside of a year, whether the Potosi drift is run through or not.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports: Alice, Feb. 20, 1670 lbs. bullion; Lexington, 20, 1320 lbs.; Moulton, 15, 1219 lbs.; Silver Bow, 20, 640 lbs.; Clark & Larabee, 20, 139 lbs. (These shipments from these Montana mines aggregate in value \$80,638). Germania, 16, \$6177; Hanauer, 17, \$4500; Germania, 17, \$6475—18, \$3170; Hanauer, 19, \$8750; Germania, 20, \$2932; Hanauer, 20, \$3930; Stormont, 20, \$3300; Wells, Fargo & Co. shipped from Salt Lake for week ending Feb. 17, \$54,428; McCormick & Co. shipped \$51,570; T. R. Jones & Co. \$47,256, and Union Bank \$16,557. Of these shipments from Salt Lake, \$95,925 was in bullion and \$75,065 was in ore. Alice, Feb. 21, \$16,016; Hanauer, 21, \$3450.

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ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Andes S M Co.	Nevada.	23.	25.	Feb 16.	Mar 23.	Apr 12.	B. Harris.	309 Montgomery St	
Alta S M Co.	Nevada.	32.	25.	Feb 1.	Mar 5.	Mar 25.	W H Watson.	302 Montgomery St	
Benton Con M Co	Nevada.	15.	10.	Feb 4.	Mar 11.	Mar 30.	W H Watson.	302 Montgomery St	
Best & Beecher M Co.	Nevada.	33.	59.	Jan 6.	Feb 10.	Mar 9.	W. Willis.	309 Montgomery St	
Buchanan M Co.	California.	15.	25.	Jan 9.	Mar 17.	Apr 5.	T J Sullivan.	121 Post St	
Con Pacific M Co.	California.	8.	15.	Feb 18.	Mar 22.	Apr 15.	E E Luty.	330 Pine St	
Forty-nine M Co.	California.	1.	10.	Feb 4.	Mar 15.	Apr 5.	A L Perkins.	310 Pine St	
Gover Improvement Co.	California.	1.	50.	10.	Feb 8.	Mar 25.	Apr 19.	R N Van Brunt.	318 Pine St
Johnson M Co.	California.	3.	02.	Feb 3.	Mar 8.	Apr 6.	G. W. He.	318 Montgomery St	
Lady Washington Con M Co.	Nevada.	5.	05.	Feb 4.	Mar 9.	Mar 29.	W H Watson.	302 Montgomery St	
Mex can M Co.	Nevada.	31.	25.	Feb 9.	Mar 15.	Apr 8.	C E Elliott.	309 Montgomery St	
Navajo M Co.	Nevada.	14.	30.	Jan 9.	Feb 15.	Mar 3.	J. W. Fow.	310 Pine St	
Potosi M Co.	Nevada.	22.	30.	Feb 4.	Mar 9.	Mar 31.	C E Elliott.	309 Montgomery St	
Peerless M Co.	Arizona.	6.	20.	Jan 11.	Feb 12.	Mar 2.	A. Waterman.	309 Montgomery St	
Pear M Co.	Arizona.	4.	10.	Jan 11.	Feb 15.	Mar 6.	A. Waterman.	309 Montgomery St	
Savage M Co.	Nevada.	13.	50.	Jan 4.	Feb 8.	Mar 1.	E E Holmes.	309 Montgomery St	
Sierra Nevada M Co.	Nevada.	81.	25.	Jan 5.	Feb 9.	Mar 1.	E L Parker.	309 Montgomery St	
Union Con M Co.	Nevada.	32.	25.	Jan 11.	Feb 15.	Mar 8.	J. M. Buffington.	309 California St	

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Anglo-Mexican M Co.	Mexico.	C A Moore.	217 Sansome St.	Annual.	Mar 9
Lucky Hill Con M Co.	California.	C D Black.	29 Ellis St.	Annual.	Mar 2
Potosi M Co.	Nevada.	C E Elliott.	309 Montgomery St.	Annual.	Mar 10

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Caledonia M Co.	Nevada.	W L Oliver.	328 Montgomery St.	10.	Feb 23
Con Virginia & California M Co.	Nevada.	A V Havens.	309 Montgomery St.	30.	Feb 19
Derbec Blue Gravel M Co.	California.	T Wetzel.	522 Montgomery St.	10.	Feb 12
Holmes M Co.	Nevada.	C E Elliott.	309 Montgomery St.	10.	Feb 21
California M Co.	California.	C E Elliott.	309 Montgomery St.	10.	Feb 21
Maubattan S M Co.	Nevada.	John Crockett.	419 California St.	10.	Feb 17
Silver King M Co.	Arizona.	J Nash.	328 Montgomery St.	25.	Feb 15
Syndicate M Co.	Nevada.	J Stadfeld Jr.	419 California St.	10.	Dec 24

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 4.	WEEK ENDING Feb. 11.	WEEK ENDING Feb. 18.	WEEK ENDING Feb. 25.
Alpa.	.30	.35	.30	.25 .40
Alta.	.10	.15	.10	.10 .10
Andes.	.15	.15	.10	.15 .10
Argenta.	1.00	1.05	1.10	1.15 .05
Belding.	.10	.10	1.10	1.05 .10
Best & Belcher.	.60	.80	.75	1.40 .10 1.35 .31 1.45
Bullion.	.25	.25	.25	.35 .40 .40
Bonanza King.	.10	.10	.10	.20 .20
Bodie Isle.	.10	.10	.10	.20 .20
Bodie Con.	1.60	1.80	1.35	1.65 1.10 1.45 1.45 1.70
Benton.	.10	.10	.10	.20 .20
Bodie Tunnel.	.10	.10	.10	.20 .20
Bulwer.	.20	.20	.20	.45 .60 .40
California.	2.00	2.30	2.30	2.70 2.05 2.45 2.25 2.40
Challenge.	.10	.10	.10	.15 .20 .25
Champion.	.10	.10	.10	.20 .20
Chollar.	.30	.90	.85	1.00 .40 .05 .85 .90
Confidence.	.10	.10	.10	.20 .20
Con. Imperial.	.10	.10	.10	.20 .20
Con. Virginia.	2.00	2.80	2.30	2.70 2.05 2.45 2.25 2.40
Con. Pacific.	.35	.40	.30	.25 .15 .15
Crown Point.	.70	.75	.90	1.05 1.15 1.10 1.20
Dry.	.10	.10	.10	.20 .20
Eureka Con.	2.20	2.25	1.35	2.20 1.25 1.85 1.85 2.70
Eureka Tunnel.	.10	.10	.10	.20 .20
Exchequer.	.10	.10	.10	.20 .20
Franklin.	.10	.10	.10	.20 .20
Gould & Curry.	.65	.70	.70	.90 .75 .80 1.05
Goodsbaw.	.10	.10	.10	.20 .20
Hale & Norcross.	2.35	2.45	2.20	2.55 2.10 2.30 2.20 2.30
Holmes.	.10	.10	.10	.20 .20
Independence.	.10	.10	.10	.20 .20
Justice.	.10	.10	.10	.20 .20
Martin White.	.10	.10	.10	.20 .20
Mono.	3.00	4.15	3.70	3.85 3.00 3.80 3.80 4.20
Maxim.	.30	.30	.30	.40 .25 .30 .40
Mt. Diablo.	8.00	8.00	3.00	2.75 3.50 .35 .50
Northern Belle.	.10	.10	.10	.20 .20
Navajo.	.10	.10	.10	.20 .20
Norfolk Belle Isle.	.10	.10	.10	.20 .20
Occidental.	.10	.10	.10	.20 .20
Ophir.	.50	.65	.45	.60 .40 .50 .45 .60
Overman.	.15	.15	.15	.20 .20 .30
Potosi.	.40	.20	.40	.20 .25 .35
Real Con.	.10	.10	.10	.20 .20
Savage.	.50	.65	1.05	1.15 1.10 1.20 1.15 1.50
Seg. Belcher.	.35	.40	.65	.80 .65 .75 .65 .85
Sierra Nevada.	.10	.10	.10	.20 .20
Silver Hill.	.10	.10	.10	.20 .20
Silver King.	7.00	8.00	8.00	6.00 .40 .60 .40
Scorpion.	.05	.05	.05	.10 .05 .10
Syndicate.	.10	.10	.10	.20 .20
Tioga.	.10	.10	.10	.20 .20
Union Con.	.15	.30	.30	.50 .55 .55 .60
Utah.	.50	.60	.65	.50 .50 .50 .50
Yellow Jacket.	.50	1.05	.35	1.00 .35 1.00

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Feb. 27.	900	Gould & Curry.	1.00 @ 1.05
470 Alpha.	40 @ 15c	500 Hale & Norcross.	2.58
200 Alta.	10c	400 Mexican.	.45c
100 Andes.	15c	20 Mono.	2.80
50 B. & Belcher.	1.50	120 Mt. Diablo.	3.50
200 Bodie Con.	1.55	400 Ophir.	.60c
100 Belcher.	1.05	400 Overman.	.35c
450 Bullion.	.50c	300 Potosi.	.45c
10 Bulwer.	.20	500 Savage.	1.30 @ 1.40
300 Chollar.	.05	100 Sierra Nevada.	.75 @ .80c
100 Crown Point.	.115	100 Union Con.	.55c
305 Con Va & Cal.	2.35	250 Utah.	.75c
50 Confidence.	1.40	200 Yellow Jacket.	1.00

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Feb. 25, 1886.	
ANTIMONY—Per pound.	12 @
Hallet's.	12 @
Cookson's.	12 @
BORAX—Refined.	54 @
1005—Changarnock ton.	22 @
2500.	23 @
2500.	23 @
American Soft, ton.	24 @
Oregon Pig, ton.	24 @
Clippers Gap, Nos. 1 & 4.	22 @
Clay Lane White.	22 @
Steel, English, lb.	16 @
Black Diamond, ordinary sizes.	15 @
PLOW.	5 @
McLure's.	13 @
Sanders & Bros.	13 @
COPPER—	
Braziers sizes.	20 @
Fire-box sheets.	20 @
Boil.	20 @
Yellow Metal.	12 @
Ingot.	12 @
LEAD—Pig.	4 @
Shot, discount 10% on 500 bag.	Drop, 8 @
Buck, 8 @ bag.	2 @
Cubbed, do.	2 @
ZINC—German.	9 @
Sheet, 7x3 ft. 7 to 10 lb. less the cask.	7 @
QUICKSILVER—By the dash.	33 @
Flasks, new.	1 @
Flasks, old.	4 @
TINPLATE—Coke.	5 @
Charcoal.	6 @
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Pig Iron, American.	16 @
Quicksilver.	43 @
Australian Tin.	20 @
Bar-silver.	1 @
Lead.	1 @
Copper.	11 @
Refined Silver (per cent discount).	20 @

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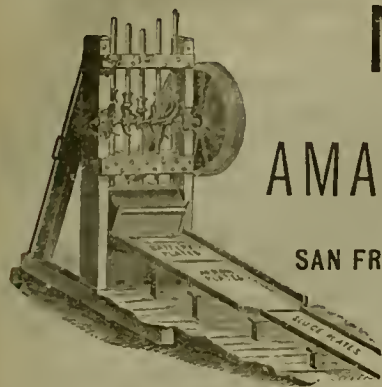
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NAMES.	No. Certificate.	No. Shares.	Amount.
Bennet, C.	9	1,000	\$ 150 00
Grisswald, A H.	10	1,000	150 00
Grisswald, A H.	13	1,000	150 00
Grisswald, A H.	14	1,000	150 00
Grisswald, A H.	18	500	75 00
Grisswald, A H.	65	500	75 00
Grisswald, A H.	67	250	37 50
Grisswald, Mrs A H.	8	1,000	150 00
Grisswald, Wm.	17	500	75 00
Grisswald, M.	18	500	75 00
Grisswald, Harriet B.	19	500	75 00
Wilson, W C.	7	20,000	3,000 00
Wilson, W C.	20	1,000	150 00
Wilson, W C.	21	1,000	150 00
Wilson, W C.	22	1,000	150 00
Wilson, W C.	23	1,000	150 00
Wilson, W C.	24	1,000	150 00
Wilson, W C.	25	1,000	150 00
Wilson, W C.	26	1,000	150 00
Wilson, W C.	28	500	75 00
Wilson, W C.	29	500	75 00
Wilson, W C.	30	500	75 00
Wilson, W C.	31	100	15 00
Wilson, W C.	32	100	15 00
Wilson, W C.	33	100	15 00
Wilson, W C.	34	100	15 00
Wilson, W C.	35	100	15 00
Wilson, W C.	36	100	15 00
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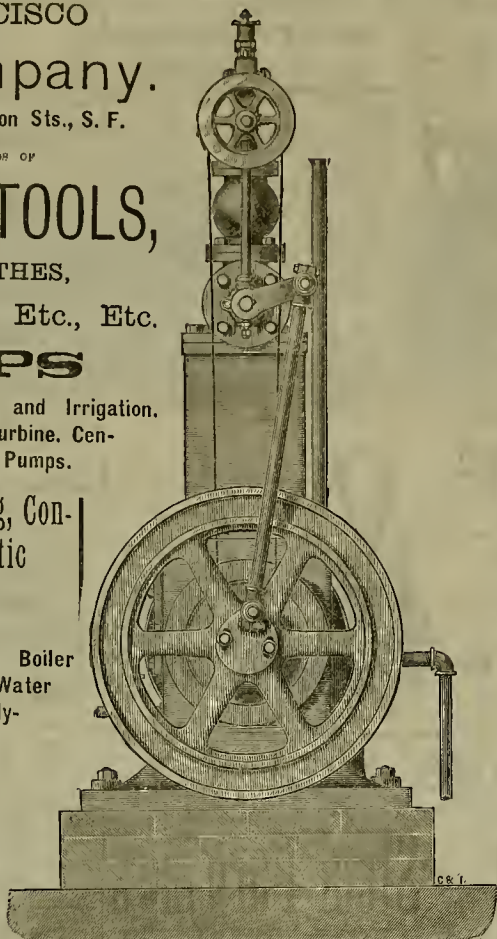
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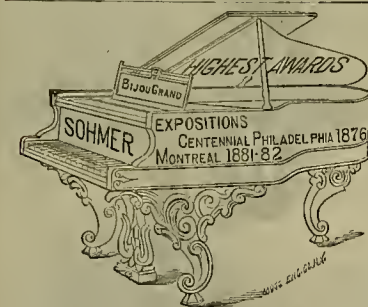
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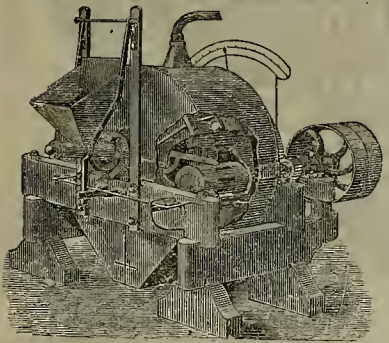
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[From the Engineering & Mining Journal, Aug. 8, 1885.] The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

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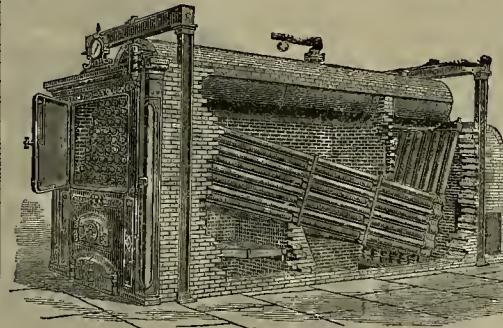
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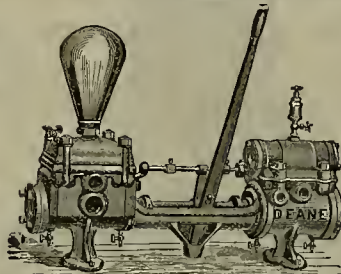
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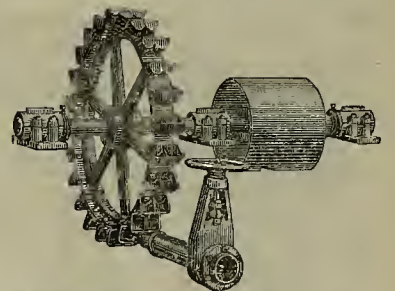
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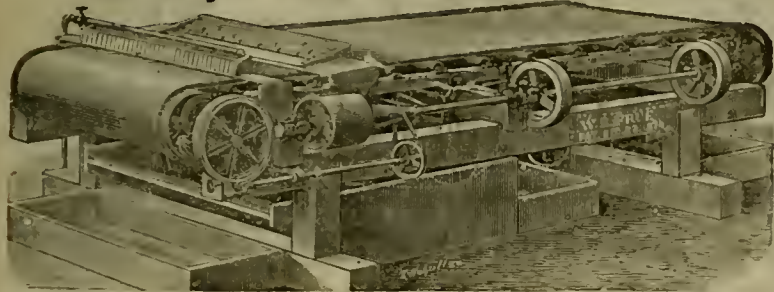
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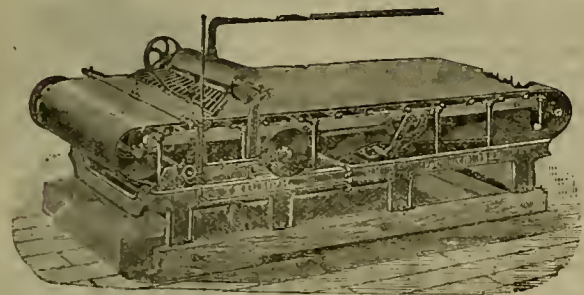
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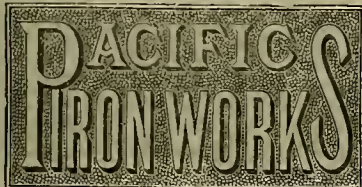
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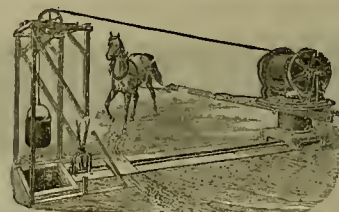
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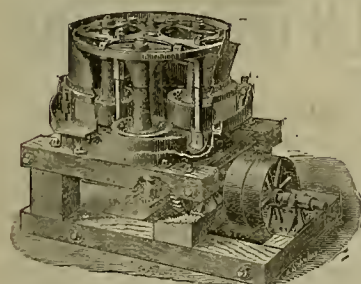
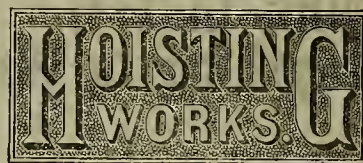
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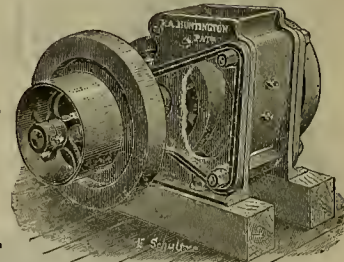


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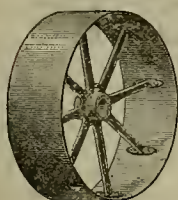
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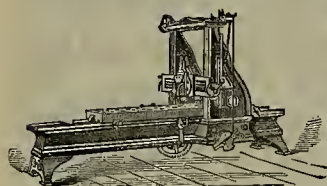
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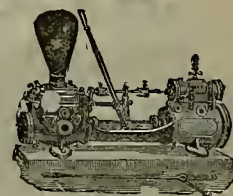
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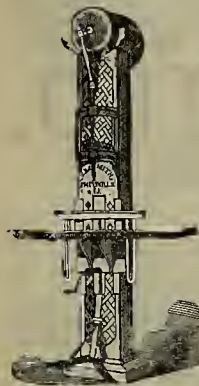
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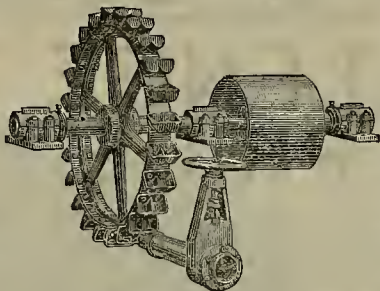
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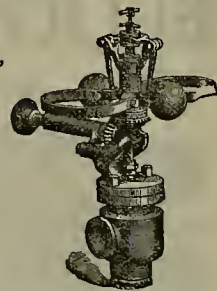


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An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, MARCH 6, 1886.

VOLUME LII
Number 10.

Slide Rules and Calculators.

The employment of mechanical devices for performing operations of computation has attracted the attention of arithmeticians for a couple of centuries past, and is to no class of persons of more direct interest than to those engaged in technical callings. These endeavors have been pursued upon several distinct lines, and we may notice by way of classification:

1st. The endeavor to perform desired arithmetical operations by devices distinctly mechanical in their nature, and seeking by the skillful combination of mechanical elements to carry out the ordinary sequence followed in the computer's calculation, which they seek to replace. We may here mention the celebrated machine of Babbage, and as a more recent illustration the "arithmometer" of Thomas, an instrument of only moderate cost, and one coming constantly into greater use.

2d. The use of geometrical figures representing the mathematical relations subsisting between mutually interdependent quantities, which, first suggested by the development of the Des Cartian geometry, have in very recent times developed into a new science—that of graphostatics—which not merely seeks to graphically present the deductions of analytical reasoning, but which, starting at the elements, builds up, step by step, methods of its own in which the arithmetical conceptions of magnitudes fall more and more into the background and are replaced by operations, mechanical at least in their application if not in conception and it goes for granted what an agent of constantly increasing power the graphostatics have become in adept hands.

Besides these two methods, we have another, somewhat partaking in nature of both the preceding, yet embodying a distinct principle of its own—that of the logarithmic slide scale.

At a recent meeting of the Technical Society of the Pacific Coast, Hubert Vischer, of this city, read a paper on "The Principle of the Logarithmic Slide Rule," from which these remarks are taken. This slide rule is of wide application, certainly of interest as an important agent for the saving of time-robbing computation, and worthy of more general employment than has been accorded to it in this country, although at least on the continent of Europe the slide rule has already become the engineer's daily pocket companion.

The slide-rule reduced to its primary elements owes its origin to a happy application of two most simple principles: the first, that magnitudes in general may be represented by the length of straight lines; the second, that these lines, when measured off upon one another may represent by the length of a resulting straight line either a summation or a difference of the magnitudes which the lines represent. The first principle underlies the logarithmic graduation of the scales; the second principle finds applications in the sliding motion which we impart to them. Slide-rules there are, of various constructions and for many purposes, but they may all be reduced to a combination of these two elementary principles.

The use of the logarithmic graduation here, as in all other cases where logarithms are employed, is the outcome of the desire to reduce all arithmetical calculations by one step in the

tion of the scales; the second principle finds applications in the sliding motion which we impart to them. Slide-rules there are, of various constructions and for many purposes, but they may all be reduced to a combination of these two elementary principles.

logarithms are represented by the same figure. The scales are all mounted upon a zinc disc (which is capable of being freely turned on its axis) and two needles—one fixed, the other movable. Expressions as complicated as—

$$1/a \cdot \frac{b}{c} \text{ or } \frac{a^2 b^3}{c^2} \text{ or } \sqrt{\frac{a^2 b^3}{c^2}}$$

selected at random out of a list of about 50 pattern forms, may be solved at one single setting

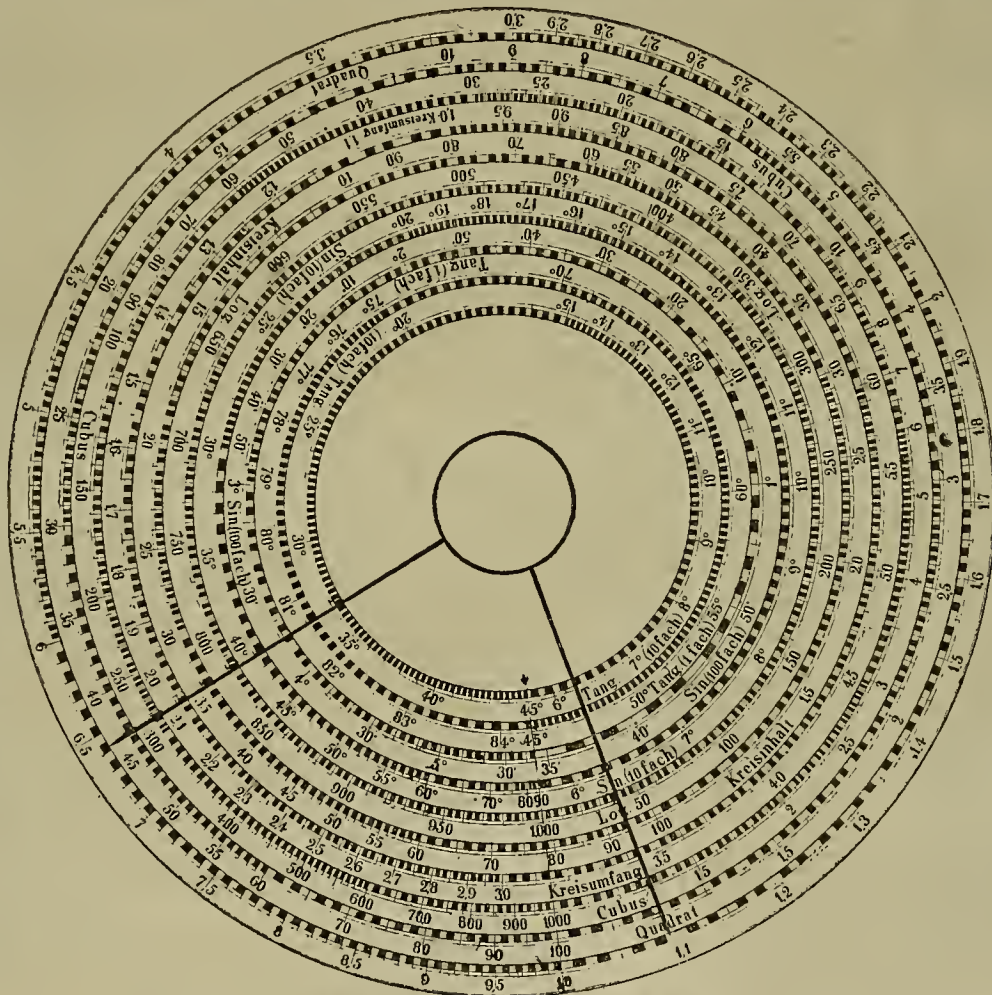
Stamps.

The most common size for a quartz mill seems to be 20 stamps. In new mills the usual weight of stamps is from 700 to 800 pounds each, though great variations occur in practice. In the census reports, tables are given which show the weight of stamps of various mills. The range in weight is from 300 to 1050 pounds. The average of 280 mills, reported as having 5,367 stamps, is 689 pounds. The heaviest batteries, as a rule, are in Nevada, and the lightest in Alabama and Georgia. Of the important mining States, Colorado appears as the locality where the light stamps are most in vogue.

Five is the usual number of stamps in a battery, though some of the old mills have four. One mill in this State has six. Millmen are commonly of the opinion that an even distribution of pulp in a battery can only be secured with an odd number of stamps, and of such numbers five is on several accounts the most convenient.

The weight of the shoe bears a certain relation to the weight of the stem, tappet and boss. For a stamp which weighs 800 pounds the shoe should weigh about 125 pounds and the die, say 100 pounds. Some millmen advocate a very thick die, but the one great objection to this plan is that the loss of crushing power when the level of the die surface is worn much below the discharge more than compensates for the gain in time and material in charging dies less often, and if the thick dies are set high at first the breakage of screens is much above the usual amount.

In gold mills where amalgamation is carried on, in the battery, the level of the die-surface is kept from 2 to 6 inches below the discharge in order to amalgamate as much gold as possible in the mortar. By means of a movable slide at the bottom of the screen, the level of the discharge can be kept the same as the die wears out. In silver mills which crush wet it



HERMAN'S CALCULATING MACHINE.

scale of mathematical operations; thus replacing multiplication and division by addition and subtraction, or reducing involution and evolution to multiplication and division.

We are unable to give at this time Mr. Vischer's remarks on the slide-rule proper, but confine ourselves to another instrument he describes—the very interesting calculator of Professor Herman, of Aix-la-Chapelle, which is also a slide-rule in principle. In this instrument (shown in the engraving) additional length of unit is attained by development of the scale upon a circle; besides, on account of the great number of scales combined together, a considerable extension of the range of direct application is attained over the ordinary slide-rule. We have ten scales, directly giving simple numbers, squares, cubes, areas and peripheries for given diameters, logarithms, sines and tangents, with the last two a separate scale being provided for each set of angles, the characteristics of whose

and turn of the instrument. The principle of the slide scale was first applied by Gunter, shortly after the discovery of logarithms. It made little progress until the middle of this century, but since that time has found application. The field is an unexhausted one, the principle capable of great development. Other mechanical constructions will undoubtedly arise, which surely will extend both range and accuracy, and special applications to special cases lie within the reach of anyone caring to apply them.

OUR Virginia City correspondent gives us this week quite a graphic description of the region thereabouts, which will repay perusal, especially by those familiar with the locality.

THE Chico Chronicle says: The Big Bend tunnel will soon be completed, the workmen only having 600 more feet of earth and rock to dig through.

is intended to keep the surface about one or two inches below the level of the discharge; but as the die wears down its surface is gradually lowered, and thus decreases the crushing power of the battery.

It is the aim of the millman to keep his die as high as possible, without endangering the screen, so as to utilize most of his die to the best advantage. In dry-crushing silver mills this is also the case, except that there is a greater loss of power in the dry than in the wet crushing battery where the die surface is much below the level of the discharge.

The maximum drop obtainable is not the same in silver and gold mills, as the stamps of gold mills should drop further than those of silver mills in order to produce the splash which assists in the battery amalgamation. In gold mills the maximum drop obtainable is from 12 to 20 inches, and in silver mills from 9 inches upwards.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Virginia City, Nevada,

As Seen from Mt. Davidson.—A Sublime Panorama.—A Striking Picture of Diversified Scenery.—The Camp as Seen From Above.

[No. 5.—By Our Special Correspondent, J. B. P.]

As we clambered over this immense wreck of mountain pottery and gained the most conspicuous eminence on Mt. Davidson, we rightly conjectured that the impression of the city beneath us would differ materially from that which was received when first viewed, and stereoscopically painted, as it were, on the mountain side whilst approaching from old Fort Churchill; nor were we greatly mistaken. Whilst the snow still lay, at great depths, on the north side of the mountain, yet we found the top quite bare, and the outcropping quartzite scattered in such prodigal profusion all over 'his promontory strikingly recalled to us the fact that we were still upon this territory of the old Comstock bonanzas. Our ascent of this peak, however, had more in view—an æsthetic rather than a metallic object—and we were soon lost to all but the surrounding scenic wonders. Having traversed the Rocky Mountain chain the entire distance from British America to a point south where it is dashed into the tumbling, crosscut and diagonal ranges, monopolizing all Western New Mexico and Eastern Arizona, till finally it is gathered into the mother of mountains (Sierra Madre), running thence to the Isthmus, it could hardly be expected that we should meet with any very extraordinary or startling objects of interest from this point of observation. However, the holdness of this spur among its neighbors is so marked that for 40 and 50 miles around it is a noted landmark in this part of the State. Towering aloft

Above the Comstock Lode,

Virginia City and Gold Hill, it rises so abruptly as to be almost monumental in its characteristics. Prof. George Davidson, in his maturing years, might well take a modest and professional pride in this ever-enduring memorial and namesake, christened to his standing, dignity and worth by his admiring friends in this community. Had he ranged his telescope from this lofty watchtower of the hills on the 12th of February when taking an observation of the eclipse of the Hyades of Taurus by the moon, instead of San Francisco, he certainly would have found a clearer sky and still more resplendent glories in that celestial phenomenon. The beautiful snowy range which may be seen, even at midsummer from the Sacramento valley, lying far to the east, here comes to greet us, in its sublime majesty, all along on our west as far as the eye can reach. The phosphorescent light of this North America Andes now glows with blinding splendor as it reflects the slanting rays of the evening sun.

The Pure Drapery of Snow

That now spreads its mantle over crest and peak, dell and dale, making, as it were, one tumultuous, billowy sea of the whole western horizon, is never wholly laid aside. It may be seen amid the glowing heats of August turning against the burning sun its glittering Medusean shields of white, and converting the Sirocco blasts of these desert winds into the healthful life-giving breezes and tropical showers. To the east of this main range, and lying in every possible attitude and direction, we observe as far as our telescopic instrument can reach, other lofty and broken links of unformed chains crowding this horizon to the north, east and south, like some mighty army of giants marching in separate columns and divisions to meet a common foe in unbroken and bannered Sierras, to force, perchance, if possible, their way to the tidal breezes of the Pacific, and there, for once, plunge their burning, naked heads and granite ribs into the cooling floods of the Occident. Vain hope! They have met with something more than a disastrous Waterloo, and the silvery marrow extracted from out their leaching bones will henceforth perform infinite service in greasing the wheels of commerce and furnishing head-lights and heacons to guide the ship of State away from the shoals of bankruptcy. Whilst, however, we can see on every side of us mountains, we discover, lying adjacent and corresponding to these elevations, beautiful valleys and outstretching plains. Along and through the midst of these we can see many coiling streams and rivers, whose bright threads of amber light can be traced for many miles into the obscure distance. Upon their borders can be seen cities, towns and villages, and frequently scattered here and there, on ranches, noble mansions with groves and barns adjoining. The Carson, Truckee, Maron, Smith, Antelope, Washoe and some other valleys lie in a cluster about us, a number of whom contain tens of thousands of acres of most fertile and tillable soil, much of which has already been brought under subjection.

Carson River

Takes its rise at the head of Carson valley, from the melting snows of the Nevadas, runs

twenty-five miles northerly to Carson city, the capital, and thence running ten miles east passes the city of Dayton, and continuing easterly still some forty miles further, debouches into what is termed Carson sink, and disappears. Prof. Rue, of Boston, with his organized company, has, during the past ten days pre-empted, or located eighteen miles of the head of this stream, and will, by the 1st of June, commence operations with his dredge boats to sluice out the slickens, or tailings deposited therein from the old bonanzas on the Comstock. The process of saving from the debris the untold millions of gold and silver, which have undoubtedly found anchorage in the bed of the Carson, is an invention and contrivance of Prof. Rue's own labor, and he is most sanguine of success. As he is sustained by an abundance of capital, we may look for a thorough prosecution of the enterprise at once. Along the banks of this river, east of Carson city, and extending some ten miles are some of the most complete and successful mill plants to be found anywhere in the Pacific States. At these mills nearly all the ores taken from the Comstock lode are now being crushed and concentrated. These mills are such as to harmonize with the magnitude of the plants heretofore described as located upon the Comstock, and are under the management of the most skillful and scientific workmen.

At the base of this Mountain

(Mt. Davidson) on which we now stand and to the west of us lies Washoe lake partly filling the valley of the same name, two miles in width by six in length, and reflecting the sun directly in our faces like a burnished mirror. Farther north can be seen the famous Steamboat Springs, and ten or twelve miles further in the same direction, we can discern with our glass a faint thread of light representing the rushing Truckee river, which issuing from its deep mountain gorge, hurries by the beautiful city of Reno, with its seven thousand people, and its numerous State institutions, prosperous schools, academies and colleges, and after pursuing its swift course many leagues further on to the east, is lost to mortal view in its desert sink. Beyond Washoe lake, and spread out in the very summit of the Nevada range, some 35 miles distant to the west, and about 2000 feet above the intervening plain, is that remarkable body of water known as Lake Tahoe, becoming so familiar and attractive to pleasure and health seekers, both in California and elsewhere. This lake, 10 by 30 miles in extent, and in depth still unfathomable, is without dispute one of the purest and sweetest bodies of water to be found in North America. Virginia, Gold Hill, and in fact the whole population about this camp, receive their supplies of water direct from this neighborhood of this vast lake reservoir, by a well-devised system of water works, and it is but fair to assert that no city on the face of the earth was ever more richly blessed by a finer article of this most needed and most indispensable fluid.

We are unable to look down upon the face of this extraordinary body of water, from the top of this mount, but we can, without standing on tiptoe, even, discern the tall and waving coronet of green pines that stretch far back from its margin, in one wide encircling wreath of timber land. And now, in brief, we have gone over with the assistance of our telescope one of the principal, fairest and most productive portions of Nevada. There are other sections which will doubtless compare favorably with this, but for extent and richness of ores, populous cities and towns, and the value of its agricultural wealth, we have comprehended and meagerly described in this survey, that which will be counted first and foremost in the State. Nearly 2000 feet below we look down and take

A Survey of Virginia City and Gold Hill.

Almost every house and object for more than four miles in length are taken in at a glance. What a miniature display! Here the whole mining plant, consisting of more than fifty extensive structures, richly endowed with the choicest and most costly machinery, stand out to the eye in bold relief. Their aggregate cost and value would be more than sufficient to purchase all the college and university plants in ten principal States of the West. The puff and wheeze of many of them indicate life and motion far down in the bosom of this mining industry. But the time for descending has come, and we speedily retrace our steps, and enter once more the streets of the city.

A Miner's Death.

The large, sweet-toned bell on the Catholic cathedral is tolling—so deeply and solemnly tolling. What can it mean? Ah, yes, a nobleman died here two days ago. He was not born to any English manor but in a village in Geauga county, Ohio. But his descent was noble and he sprang from a stock whose blood was steeped in patriotic devotion and enthused with the warmest deeds of humanity. An army of men, dressed in the livery of woe, is tramping eight abreast through the principal street, and every vehicle of two cities sweeps into the train. There appear to be more honest tears shed at this funeral than when Lord Wellington and many other generals since his time left their fame and bloody deeds behind to enter upon their final reward. This disguised nobleman was of such independent and royal blood that he appeared to be connected with no order, civil, military or ecclesiastical, but having lived here 20 years or more and having discovered several bonanzas and landed on the surface more

silver dollars than most hankers ever saw or handled, the people, knowing and appreciating his kindness and benevolence to thousands who have come and gone from these mines, turned out en masse to pay their last respects to his remains, and to share their sympathies with his stricken family. The able Catholic clergyman too, seemed to vie with the people, and after reading a short prayer entered upon a very eloquent Christian oration to the densely crowded auditorium, breaking down all barriers of formality. And this well-known but modest and retiring citizen, whose disease has created such a sensation in all the higher and lower walks of life here, was no less a person than Mr. H. Lamb, one of our first acquaintances formed here, foreman of the Consolidated Virginia and C. and C. mines, who so nobly and kindly introduced me to Mr. J. B. Shaw and other assistants who were to aid in my visit to this mine. His demise is mourned by all amid tears and benedictions.

If these mines have made millionaires, they have also fashioned and molded some men with characters which millions cannot create or buy.

While the output of bullion here has been enormous, it has by no means been adequate to alchemize some types of characters, and to turn such fine metal to dross. The hopes of a world are largely dependent upon the words and deeds of such men. J. P. Jones and J. G. Fair are the natural political creations of this camp, and now in their senatorial seats in Congress are counted upon as infallible representatives of the common people throughout these Western and Southern States. It is well known that millions of money could not swerve their vote in any important legislative action concerning the welfare of the public. Firstly, they do not need the gold nor the silver; and, secondly, all the accumulations of Wall street combined would not be sufficient to convert them into political knaves.

Bishop O. W. Whitaker, of this Episcopal church, with his hundred young lady pupils gathered from all parts of the State into his noble Christian school at Reno, has done his principal work in this city, prior to founding the above college. It is certainly an institution that would reflect credit upon any State in the nation, and owes its origin to a pioneer workman who has devoted the strength of his years to moral and educational culture in this camp. Whilst the inordinate love of money is most certain to work corruption, yet the seven times heated furnace that has tried true moral worth in this camp, has brought forth from the reduction works, in the end, something that the world may well prize as more precious than gold or diamonds.

Mineral and Metalliferous Veins—No. 2.

EDITORS PRESS:—I observe that a former article of mine on this subject has at least been the means of some adverse criticism. However, as none of my opponents have seen fit to prove my theory false or substantiate their own true, on a practical scale, it is needless to say that I still hold to that which I conceive tenable. In the first place, I have no time to refer to the assertions in detail of my critics, for the simple reason that it would require considerable space in the PRESS, and, to be brief, the game is not worth the powder. I was somewhat amused at the sophistry of Mr. Brown in reply to my article. This gentleman evidently seems to think that I make a specialty of combating natural facts—that I have no desire to know the truth, even no fear to believe an untruth. Now, it is useless to say that the exact opposite is what I hold. I do so, mind you, merely to inform and set aright all those who adjudge me guilty of intentional deception. What I meant in my former article is, that I have given the subject many years study and based all on facts as derived direct from nature.

Mr. Brown exclaims that "it is human nature to meet each new discovery with opposing forces, nevertheless truth will prevail." So it is plain enough, according to that, to conclude that Mr. Brown considers the writer a crusher of truth. I wish to say right here that I consider "the discovery" of Mr. Brown "the new discovery"—the "tin type" plate referred to, of no use whatever to the solution of the very intricate question of the genesis of ores or metalliferous veins. "The chemically prepared metal-plate" may be of interest in itself, but surely it can be no criterion whatever in solving the matter in question. Like causes produce like results. The terrestrial globe is one thing, and "a chemically covered metal-plate" another. One is exquisitely simple, the other profoundly complex—one is the work of man, the other that of nature. There is no analogy, and there is no use to discuss the subject, as stated, with the hopes of gaining new light. Any person with an atom of reason in their composition will be forced to dismiss the question as barren of practical results, as well as see that it is "theoretically superstitious!"

"Metal plates" cannot be the philosopher's stone with which to settle the question. But I do not believe that the light of science will lead to the fire of truth—"satisfactory results can come only by natural observation." With the facts in hand the work can be proved. The way to do this is to not leave the mines but

stay with them. We cannot see beyond the pick and drill, to be sure, but we can, most assuredly find out some of the unknown secrets of nature by staying with this facts, "and surely not by ignoring them." Mr. Brown asks: "Who has ever learned of a hot spring filling a crevice with precious metals?" It seems that he is not aware of this fact that the Steamboat Springs of Nevada are constantly doing so. That the waters are strongly alkaline and depositing silica in abundance; that the fissures are being filled with this ledge matter and that in the same may be found the sulphides of iron, zinc, mercury, lead and copper, while assays reveal gold and silver. About the geysers of the Yellowstone National Park I have also observed the deposits, from solution, of silica, and escrite in some of which shows iron sulphides. Doubtless both gold and silver would be present were it not a sedimentary formation—"being largely magnesian limestone and fossiliferous blue lime (Silurian and Devonian)." I find that the metals gold and silver are mostly derived from the older rocks, especially the metamorphic rocks. And that the metals in the veins are leached from the rocks, from the adjacent formation in which the veins or deposits are situated. And I hold that the richer metalliferous solutions come from below. Those heaviest in metal are from the more extensively metamorphosed rocks. Deep fissures reach those parts in the earth where chemical activity is very great. At such places I hold are the sources of the precious metals. The mineral solutions on reaching a fissure precipitate their metallic wealth either chemically or mechanically—either through chemical affinity, or else the agency of heat causes the waters to evaporate, thereby leaving all mineral or metal which it once contained in solution.

The formation of rock candy or rock salt is similar to that of crystallized quartz or Iceland spar. It is all under and according to the same law. Place a drop of ocean water in the field of a microscope and observe the formation by evaporation, and it will give you an idea of what I mean. The minerals may be seen to crystallize from the solution, and it is a sight worthy to be seen. But enough at present. I am pleased to see our subject agitated, knowing that the truth will prevail.

For the interest of Mr. Brown and other opposers of the solution theory, I wish to say that some five or six years ago I remember reading in the PRESS about some old mines in Arizona. The mines had been abandoned for many years, and of course were full of water. When this water was pumped out it was found that mineral and metalliferous incrustations had formed even on the old timbers. Small particles of gold were taken from the wood, while an assay of the outer parts of the timber showed several hundred dollars to the ton. I would like to know how this metal came there unless deposited from solution. For my own part, I am convinced that the solution theory is the true one; that the metals in the veins are brought in by and deposited from the solutions (mineral waters); that it is being done at the present time as it has been in the past, and will continue as long as the conditions remain favorable. Anyone acquainted with the rudiments of crystallography can readily perceive that the structure of ores as we find it in its original state must have formed from the mineral solutions. Mr. Brown holds (believes) "that the spurs are 'feeders' to the main vein." I hold that the main vein is the source from which the spurs are filled, and I also hold that "contact veins" are formed in the same manner as fissure veins, excepting those cases where the strata may have been folded. When an extensive formation is thrown on end (vertical) it is or can be an easy matter for a fracture to happen or a fissure to be broken between the different rocks. The line of cleavage between two different formations is not so strong as that of a single formation. Most mineral veins are simply what is known in geology as "faults," especially those veins of which the walls on the two sides do not correspond with each other—one side has been pushed up or dropped down, hence a fault; and in these faults—"some of them," we find mineral and sometimes good mines. These are facts, and don't you forget it!

CHAS. F. BLACKBURN.

Kayseville, Utah.

AN official decree was published February 1st in Paris announcing the appointment of a permanent commission, charged to examine all questions connected with the monetary standard in France and foreign States.

STEAM BOILER INSPECTION.—The Judiciary Committee will report at the next meeting of the Board of Supervisors against the introduction of an order providing for the appointment of an inspector of steam boilers.

C. C. STEVENSON, one of the most prominent mining and milling men on the Comstock, received a handsome cane from the employees of the Kentuck mine, on the occasion of his 60th birthday.

A BED of coal 20 feet thick has been discovered near Oilequa, W. T., and it will be at once opened. A large deposit of alum has been found in the same locality.

THE Churchill Soda Company of Nevada have completed their furnace and have on hand about 300 tons of soda ready for drying.

MECHANICAL PROGRESS.

A UNITED STATES BUILT GUN FOR THE BRITISH NAVY.—No little excitement was recently produced among English steel masters, by the receipt at the Woolwich Navy Yard of a 40-ton steel gun, with its projectile by its side, which had just been received from the United States. The fact was duly announced, with comments, by the *London Times*. The gun was one of Ericson's late inventions for submarine use. It is 30 feet in length, with a 16½-inch bore. This novel weapon throws a projectile 25 feet long, weighing one ton. The idea is to fit the gun in the bow of a ship nine feet below the water line, so as to fire straight ahead from the cut-water. The projectile, notwithstanding its great length, weighs only one ton; but the principle of the gun admits likewise of the firing of torpedoes as well as projectiles below water. Lying charged under the sea's surface, the gun has a diaphragm of india rubber fixed over the muzzle to exclude the water. This, of course, is instantly blown away, when the gun, whose projectile has been inserted at the rear, is exploded. A charge of 20 lbs. of powder is all that is considered necessary for propulsion throughout a submarine range of 300 yards. The experiments will prove whether more than half this distance can be accomplished against resistance of the water without a sacrifice of striking power. How the gun is to be reloaded after the first discharge has not, we believe, been explained. British steel will doubtless be used, if it should be found desirable to duplicate the gun.

THE MANUFACTURE OF FILES.—The improvements and changes in the manner of making the common, yet indispensable instrument, the file, in its various forms and for variety of uses, have been many. The first files were probably made from the dried skins of fish, species being selected the skin of which had a fine and tough scaly surface. After this metallic files came into use, but for centuries the forms of files were rude and their execution was very rough and imperfect. With the rapid advancement of the various mechanical arts, German, English and Swiss file makers greatly improved their wares, until it seemed as though they were little less than perfect. Switzerland has furnished for many years the greater proportion of the files used by jewelers, watchmakers, gold and silver-smiths, dentists, etc. Within 20 years American file making has made such progress by the application of machines to do the work performed by foreign makers with a chisel and hammer in the hands of a workman, that our markets could very well supply the wants of any artisan with American files. They are made varying in size from two inches in length, with 150 cuts or teeth to an inch, to those of 30 inches, with only 12 teeth or cuts to an inch. File makers in the United States use nearly or quite 4,000 tons of steel per annum, and some of their establishments make more than a thousand files per day.

PRESSURE ON BEARING SURFACES.—The pressure which may be permitted upon rubbing surfaces is determined by the velocity of rubbing, the character of the lubricant and the nature of the surfaces themselves. The two surfaces should usually differ, one being hard enough to bear the maximum pressure without change of form, and the other being less hard, in order that it may not abrade the first. With such an arrangement the surfaces, if properly cared for, take a fine, smooth, mirror-like polish and give a minimum frictional resistance. Cast-iron surfaces, according to Thurston, unless very large, are less satisfactory than good wrought iron, and moderately hard steel is much better still. A pressure of 800 pounds to the square inch can rarely be attained on wrought iron at even low speeds, while a pressure of 1200 pounds is not infrequently adopted on the steel crank-pins of steamboat engines. Pressures from 7000 to 9000 pounds per square inch have been reached on the slow working and rarely moved pivots of swing bridges. Pressures higher than from 600 to 1000 pounds per square inch on iron and on steel are to be avoided, and for general practice the pressure is less as the speed is greater, since the amount of heat developed is directly a measure of the amount of work done in overcoming friction, and is thus proportional to the speed as well as to the pressure.

FOREIGN VS. AMERICAN BLOOMS.—The fact that large quantities of foreign blooms and billets are being brought to Pittsburgh and vicinity—the great center of the steel industry of the United States—is not soothing to our local pride; but the smart is less painful says the *Iron Age*, when it is remembered that the foreign invasion is solely the result of the high wages paid in this country.

Yes, but if such a condition of things is to continue indefinitely, the smart will soon become wellnigh unbearable. The only remedy that suggests itself to avert such a calamity, is the reduction of wages here or an increase in protection to our workmen. This country cannot afford to import her iron from England.

BRITISH BAYONETS.—A very lively stir is being made among English ironmasters and others, about the defective bayonets which are being found, on testing, in the hands of her soldiers. From 15 to 25 per cent of these are defective in one or another respect. The newspapers are making a great row about the mat-

ter, and allegations are made, first, that the bayonets were made in Germany or that the steel was procured there. Alternatively they are said to come from Birmingham, but the makers in that town have not supplied any for 10 years; consequently, the fault lies with the Ordnance Department. That department brings some steel from Germany, but mostly uses Sheffield brands, and it is understood that these had weapons are stated to have been made from Sheffield steel. This is not credited, and the general idea is that the English people have in some way mixed up the steel and do not know exactly whether they used Sheffield or German.

AN INVENTION TO FACILITATE PLASTERING.—While almost or quite every other art and science, has been improved in facility or quality of work, plastering seems to have remained stationary, if we except only the means employed for elevating the mortar to the workman. But a device has recently been invented which may be termed a plasterer's platform, which is set on casters and which may be elevated or lowered to wall or ceiling as the convenience of the workman may require. Accompanying this device is an improved two-hand trowel. The platform is capable of extension in a horizontal as well as in a vertical direction. By the combined use of these two inventions all cumbersome staging and the old antiquated hod and short single-handed trowel used ever since the building of Solomon's Temple are all dispensed with. The mortar is placed in an extensible trough, which is suspended on the platform convenient to workmen. The apparatus can be readily moved endwise through doors from room to room. It is claimed that by the use of these devices the cost of laying on either plaster or hard finish is reduced fully one-half, and the work made much easier.

SELLING MACHINERY.—The manufacturers of the best class of machinery sell the same on its exact merits; they find no use for extravagant words in which to state the good qualities of what they sell. It would be better if all connected with the manufacture and sale of machinery adopted this course. Extravagant promises usually defeat the end in view; too much is known in a general way of the possibilities and impossibilities of mechanics, to permit of their having any weight in the desired direction. They damage the one who makes them, and unfortunately they work injury in another direction. If a man really makes substantial and somewhat phenomenal progress in some direction, he has difficulty in introducing what he has perfected, from the fact that his device is likely to be judged on the basis of extravagant promises. A plain statement of facts is, in the end, the best.

THE ADHESION OF FRESH MADE AND REMELTED GLUE.—According to Tredgold the adhesive force of fresh-made glue, cementing together two pieces of dry ash, after being left for 24 hours, was found to be 715 pounds to the square inch. With glue which had been melted the adhesive power was reduced to from 350 to 360 pounds to the inch. The lateral adhesion of the fibers of a piece of Scotch fir, quite dry and seasoned, was found to be 562 pounds to the inch; therefore with fresh-made glue the wood would have parted before the glue. The strength of common glue for coarse work and to stand the weather is increased by adding a little finely-powdered chalk.

STOVE PIPE JOINTS are now made to screw together. A machine has been devised which, while it bends and forms the joint at the same time forms the proper thread at each end of the joint. The same machine will form joints of different diameters by merely changing the simple device which forms the thread. Pipes so joined are much stronger and stiffer than when put together in the ordinary way.

A HEAVY DAY'S WORK.—In January last there were turned out at the Joliet Steel Works the result of one day's run of their rail train 1658 30 foot rails in 10 hours and 45 minutes—a few days later the same train turned off 1728 rails in 10 hours and 15 minutes. The labor of controlling the machinery, doing the blooming and finishing was performed by five men. The rails were drawn from 14-inch ingots direct.

The efficacy of iron bulkheads in steamships was strikingly shown in the case of the steamer *Crystal*, bound from Newcastle to New York, which was ten days at sea with fire in her main hold. By closing every aperture which could admit air to the cargo the steamer was kept afloat until fire-boats came to her relief in New York harbor. The damage was about \$10,000.

DRILLING IRON AND STEEL.—For turning and drilling wrought-iron and steel, one ounce of a mixture of soft soap, with half its weight of pearl-ash in about one gallon of boiling water, is in everyday use in most engineering shops. The work, though constantly moist, does not rust.

A LARGE PULLEY.—In England a pulley 63 feet in diameter and weighing 83 tons, has just been made. It has grooves for 32 ropes, which together will transmit 1280-horse power, and the rim will have a velocity of more than a mile a minute.

SCIENTIFIC PROGRESS.

Increase of Damage From Lightning.

German scientific papers and scientists are just now much exercised over the result of some statistics which have been recently collected and published, and which go to prove the rather unexpected and unwished for discovery that the amount of damage done by lightning in Germany and the neighboring smaller States is rapidly increasing from year to year.

A German electrical journal, in a late issue, says that the whole question of danger from lightning has assumed a new aspect during the last 15 years, and taken increased importance not only from a meteorological and scientific point of view, but also from that of the public welfare. In 1869 the well known meteorologist, Professor von Bezdol, published the results of an investigation he had carried out, based upon the books of the Bavarian Fire Insurance, in which about 90 per cent of all existing buildings are insured. In these books accurate account would be kept of all the cases in which lightning had affected any of the insured buildings. The first results of this investigation show that there was a regular increase going on in the number of instances of lightning striking buildings, reckoned as percentage on the buildings, of course; and a later publication in 1884, giving a continuation and more exact and complete examination of the figures obtained, showed the result to be that during the 50 years from 1833 to 1882 the percentage of insured buildings struck by lightning in Bavaria had increased at least threefold.

The publication of this investigation caused others to be undertaken, and one for the Kingdom of Saxony showed a similar increase. Professor Holtz in 1880 published a second series of statistics based upon German insurance companies' books which fully sustained the proportion of increase already named. Returns have been more recently issued concerning the provinces of Prussian Saxony for the two decades 1864-73 and 1874-83 which show that from one decade to the other the risk from lightning has almost doubled. The final conclusion to be drawn from this considerable mass of apparently reliable figures is that, for the whole of Germany, during the years between 1850 and 1880 the lightning risk has increased threefold. That is to say, out of any given number of buildings three times as many would be struck by lightning during 1880 as were struck during 1850.

So far as can be seen, the increase is still going on since 1880, and there seems no reason to doubt that we have to deal with a steadily increasing risk of damage from this source. This is sufficient reason for urging the great importance of protecting all buildings by means of properly constructed lightning conductors.

The steady increase of the danger being thus apparently proved on the best authority and admitted, the investigator naturally tried to ascertain in which direction they might look for an explanation of the facts, and the question mainly arose as to whether the increased number of lightning strokes is caused by an increased number and increased severity of thunder-storms or whether the reason lies in some changed conditions of building, as more especially the greater use of metal in construction and in gas and water pipes, etc.

The two principal authorities named above appear to have arrived at different conclusions. Professor von Bezdol holds that so far as concerns his investigations in Bavaria, both the number and intensity of thunder-storms have increased, and that any influence of the mode of construction of the buildings is quite a secondary matter.

Holtz, however, in his investigations based on meteorological returns, fails to find any proof as to increase of storms, whereas he has prepared, at great trouble and expense, statistics to show that exactly those districts in Germany, where most metal is used about the buildings, are also those in which the largest number of lightning strokes are recorded. It appears clear, however, that when the explanation has to be looked for, we are no longer on good, solid ground. Probably, now that these surprising facts are pretty well established and are attracting a great deal of attention in the proper quarters in Germany, very exact records as to thunder storms will be prepared, and will, in due course, enable more decided answers to be given as to the cause or causes of the increase of damage done.

It would be of very great interest to know whether any returns have been prepared as to the effects of lightning in this country. Certainly no part of Germany can be less addicted to lightning rods than we are, if we except churches and tall chimneys. It is stated in the article from which we have quoted, that one or two special districts, as Saxony, are very much better provided with conductors than the rest of Germany. It would be interesting to have some definite statement as to the amount of protection which can be proved to have resulted in these specially cautious regions. The figures quoted above, from the Kingdom of Saxony, would appear to show that, however well it may be protected by conductors, it certainly comes in for its fair share of the general increase of lightning strokes.

PROGRESS IN SPACE.—There are only two

kinds of progress in space. One is that of matter, the other is that of form. An arrow discharged from a bow, or a bullet from a gun, represents the former of these, while the ever-widening circles which follow the plunge of a stone into a pool of water represents the latter.

Refining Sugar by Electricity.

The aid of electricity has of late years been successfully invoked in aid of numerous industrial processes. The latest application of this subtle agent has been in the direction of refining sugar, which it is stated has proved a complete success, doing its work with great rapidity and economy, far in excess of any process heretofore devised. The invention is that of Professor Fried of New York; but the method by which the process is accomplished has not yet been made public, the trials having been made in the presence of experts only. Even they have only been permitted to witness the results and not the *modus operandi*—the effect but not the cause, at least not in detail. It is stated, however, that the invention has been thoroughly tested and upon a commercial scale, with such success as to induce the formation of a company in New York for an extensive refinery by this new process. It is affirmed that by this new process, raw sugar of the lowest quality can be converted into refined sugar of the very best description as easily and at the same cost as raw sugar of the highest quality. The process of conversion does not require in point of time more than four hours, that is to say, from the time the machinery is set in motion, the refined sugar is produced inside of four hours, and the production once commenced, the output of refined sugar is continuous, so long as the raw sugar is supplied. This is a great saving of time over the most expeditious of any of the ordinary processes. It is claimed that the product upon analysis shows no less than 99.9 per cent of pure sugar. In addition to exhibits of this product in New York and other cities on this continent, several barrels have been sent to Liverpool, where it is pronounced of the best quality and is exciting a large amount of attention. Should the new process prove all that is claimed for it, it will materially interfere with a large industry involving millions of capital, both in this country and Europe, and lead to important changes in connection with the sugar refining industry generally.

A NEW MOTOR POWER.—A motor in which the power is derived from a supply of caustic soda is being tested on a new street railway in Chicago, apparently with excellent results. It is claimed for this device, according to the *Railway Age*, that it is noiseless, economical of operation, reliable, and of course without smoke, steam or cinders, and capable of running up to ten miles per hour, and of being stopped, at ordinary street-car speed, within a distance of five feet. The two motors which have been procured for this road were imported from Germany, where they are said to be successfully in operation on a suburban railway running from Berlin. No figures are at hand as to cost of operation in comparison with steam or horse power. If the device is all that is claimed, it may work a revolution in the propulsion of street cars. So far, however, as the dispensing with the use of horses is concerned, the cable system has already made that possible.

OSCILLATION OF CHIMNEYS.—The amplitude of the oscillation of chimneys has been exactly measured by observation of the shadow cast by the sun upon the ground. Recently, the oscillations of a chimney 115 feet high and four feet in diameter externally at the top, near Marseilles, France, were observed by the shadow during a high wind to attain a maximum of 20 inches. It was estimated that the chimney, deflected by an initial impulse, would have made four or five oscillations before returning to a state of rest. On the contrary, by a succession of impulses isochronous with the oscillations, a chimney may finally be overthrown. Such is the explanation of the destruction of certain chimneys, in which, nevertheless, all the conditions of statical stability were fulfilled.

NECTAR-SECRETING PLANT LICE.—Oregon seems to be the place, of all others, for nectar-secreting plant lice. During the past fall, says a correspondent of *Science*, I received sprigs of spruce and willow from Oregon, which, though not more than six inches long, contained at least a tablespoonful of crystallized sugar, which was both sweet and pleasant. The insect which deposits this nectar is a species of aphid, and though possibly not equal to the bee, or to the manufacturer of our best cone-sugar, in her power to form an excellent article of sugar does greatly surpass the glucose factories in the quality of the product she turns out.

THE LATEST PHOTOGRAPHIC DISCOVERY.—With a lens made of rock salt, it may be possible to photograph in the dark! The *Photographic News* states that Ahney has succeeded in preparing plates which are sensitive to the rays lying beyond the red end of the spectrum, the dark heat rays, and with such plates used with a rock salt lens there should be a possibility of photographing bodies which possess a high temperature, although that temperature may be far below that needed to render them self-luminous.



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G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, March 6, 1886.

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Passing Events.

There is nothing of special moment to record from the mining regions, aside from the fact that there is unusual activity in the gold mining sections. The low price of lead and copper and the uncertainty on the silver question, are important factors in this increase of interest in gold properties. It is not confined to this State, though, as the principal gold producer, we will reap the greatest benefit in California. Our mining industry here is at present rather prosperous and any increase of demand for gold mines will give our miners a better chance than ever to make money.

The newly discovered district in Monterey county has not so far shown any developments to warrant much excitement.

Some attention is being given to mines in Fresno county again, and it is stated that San Francisco capital is being invested there.

Columbus district, Nevada, is again looking up. The new mill just started will greatly help the miners in that camp.

THE White Pine News says an important strike has been made in the Argus mine. This is encouraging news for the camp, as it shows conclusively that the mines of the district are not "blanket ledges," as supposed, but are liable to reach to great depth.

Inspecting Hoisting Cables.

The question of inspection of hoisting cables is an important one to miners. It is evidently the prevailing practice, at least in theory, to inspect cables daily. In large mines a special ropeman is generally employed, whose duty it is to keep constant watch of the cables in use, except when actually engaged in repairing spare cables. Instances where cables are not properly inspected are comparatively few. The miners are sufficiently awake to their own interest in most cases to see that this duty is thoroughly performed, and no mine can afford to acquire the reputation of neglecting its hoisting apparatus.

It might at first sight appear to be safer to throw out cables which showed signs of wear and put in fresh ones, and this method is actually practiced to some extent with fiber ropes and small steel cables. With heavy cables, however, such a course would be ruinously expensive, and there would be a strong tendency to delay renewal too long. Flat cables, in particular, can be easily and thoroughly repaired by splicing in new strands or sections. Cables wear most at certain points, especially where they rest upon the sheave when the cage stands at a station.

During the investigations carried on by the census officials, this question of cable inspection was examined. Reports were received from various mines in all the mining States and Territories. The results are tabulated, and a recapitulation of the statistics will be of interest. This recapitulation is as follows:

	Number of Mines.
Inspected constantly.....	18
Inspected twice a day.....	2
Inspected daily.....	201
Inspected tri-weekly.....	1
Inspected "every day or two".....	1
Inspected semi-weekly.....	4
Inspected weekly.....	13
Inspected weekly when cable is new, daily when old.....	1
Inspected irregularly, occasionally or seldom.....	22
Inspected every two months.....	1
Inspected semi-annually.....	1
Total number of mines reporting inspection of any kind.....	270
Mines reporting no inspection.....	18
Mines using cables, etc., from which there are no returns.....	132
Total number reports.....	420

Practical Hydraulics.

In this number of the PRESS, in the article on "Practical Hydraulics," is applied the principle demonstrated in our last number with respect to the least weight and consequent least cost of an inverted siphon discharging a given quality of water.

The example taken, namely "Ex. 91," differs not materially from that occurring in a project of supplying San Francisco with water from a mountain source.

A comparison of the results of the two solutions given of this example shows, that when the hydraulic head is made 407.34 feet as determined by the application of this principle, the cost of the inverted siphon will be \$1,795,713 less than when the full hydraulic head of 950 feet is employed. In other words the saving amounts to over 11 per cent.

"There will in fact," says the author, "be a greater saving in practice, arising from a less length of pipe under pressure, in case of employing the smaller head."

This principle appears to have escaped the observation of authors on hydraulics prior to its demonstration and enunciation by Mr. Randall. The solution of the problem of minimum weight and consequent minimum cost of an inverted siphon, requires as seen by the discussion the application of the higher mathematics which, to a portion of the readers of the PRESS, may seem forbidding, but by engineers will be appreciated. To meet the requirements of all classes Mr. Randall, pursuing the plan adopted throughout the preparation of the work "Practical Hydraulics," now being published in the PRESS, has from the results of the solution of this most important problem, written out simple rules which anyone familiar with the four fundamental rules of common arithmetic can readily apply. There are hundreds of cases where this principle can be applied all over the State.

We would further call attention to his discussion of the "Flow of Water in Open Channels and Natural Streams" and "The Most Appropriate Form of a Canal"—that is the form of the greatest carrying capacity.

Rules and practical application will be given in our next number.

Study of Mining at Our University.

The College of Mining at the University of California is designed for students who wish to become mining or metallurgical engineers, or to engage in one of the many pursuits connected with the mining industry, such as the surveying or mapping of mines, assaying and working of ores, designing and use of mining or metallurgical machinery, or the exploitation of mines. For the undergraduate course certain preliminary examinations are necessary, and it generally takes four years to complete. During the first two years considerable time is devoted to language studies. Preliminary to the purely technical studies of the course the student receives a sufficient training in those branches of modern physical science which lie at the basis of all the industries connected with mining: on the one hand, mathematics and its application, and on the other chemistry and its allied branches.

The mathematical studies are pursued with special reference to subsequent practical applications in surveying, physics and analytic mechanics, which in their turn serve as a means for discussing such subjects as strength of materials and hydraulics. A similar sequence is observed with other studies; thus descriptive geometry is connected with work in the drawing-room, surveying with extensive field practice and the mapping of surveys actually made by the student, physics with physical problems and work in the physical laboratory, strength of materials and hydraulics with original designs in the drawing-room, followed by working tests in the mechanical laboratory. This important series of studies extends through the whole four years' course.

The studies in chemistry and allied branches begin with general experimental chemistry, inorganic and organic, followed by analytical chemistry as an application, viz., qualitative, quantitative and blowpipe analysis, subjects indispensable to subsequent work in metallurgy and assaying. Having acquired a working power in chemistry, the student begins the study of mineralogy, which is developed with special reference to its bearing on mining, and is followed by a course in geology.

The technical branches of mining, metallurgy and assaying peculiar to this college are taken up in the senior year, when the student has sufficient training in the collateral branches to study them with profit.

The courses in mining and metallurgy are illustrated throughout by maps, plans, drawings, and sketches of mines, furnaces, etc., together with actual working results whenever possible. The illustrations and references are drawn from typical mines and reduction works in operation in California and Nevada, so that the vacation trips of the student may be made more directly useful to him. In order that the student may have a ready means of following up any subject for himself, constant reference for details is made to the best technical standard and current literature in English, French and German works.

In the course in metallurgy, after the general consideration of the subjects which concern the treatment of all the metals, the rest of the undergraduate course is devoted to a thoroughly detailed study of all the important methods in use for the reduction of the ores of lead, silver, gold and quicksilver. These metals have been selected as most intimately connected with the California industries, and in order to give them the prominence which their importance demands, the treatment of the other metals has been reserved for the graduate course.

In assaying, the treatment of each metal is explained by lecture, following which, the student is required to work the metal in the laboratory, and to obtain accurate results before another is treated. For this purpose, parcels of from 500 to 1,000 pounds of ore will be assigned to students, who will be required to crush, sample, assay or analyze the samples and determine the best method of treatment, and then work the ore under proper supervision, and determine the yield and the nature, amount and causes of loss. Since the wet methods are discussed in the quantitative laboratory, most attention is paid to fire assays. Throughout the course students are advised to spend their vacations in examining typical mines and smelting works in various parts of the State.

An arrangement is made so that special students who may not be able to take the full

undergraduate course may attend such classes in mining, metallurgy and analogy, or they may be prepared to enter in accordance with the provisions of the joint regulations of the faculties at Berkeley.

Those who wish to pursue advanced or special work after graduating have every facility the libraries, collections and laboratories offer. Candidates for the professional degrees in this college must satisfy the following conditions:

To obtain the degree of mining engineer he must be a graduate of the college of mining at the University of California, or he must give evidence satisfactory to the faculty of having successfully pursued a course of study equivalent to its regular undergraduate course. He must also pass a satisfactory examination in the following subjects: Mining, ore dressing, petrography, economic geology, thermodynamics (elements), drawing and construction of mining machinery, blowpipe assaying, and political economy. He must have had at least one year of actual practice in the field in the course chosen, and must show by an original memoir upon some subject bearing upon this profession his power to apply his knowledge to practice. This degree will not be given earlier than three years after graduation.

A candidate for the degree of metallurgical engineer must pass an examination in the following subjects: Metallurgy, ore dressing, assaying and analysis, blowpipe assaying, thermodynamics (elements), drawing and construction of furnaces and metallurgical machinery, and political economy. In all other respects the conditions are the same as those required for the degree of mining engineer.

Improving the Quality of Water.

Those who obtain their water supply through cisterns, reservoirs, etc., will be interested in the suggestions made by the expert employed by the Oakland City Council on the possibility of improving the quality of the city water. Mr. L. J. Le Conte, the engineer in question, after calling attention to the occasionally unpleasant odor of the Oakland water, says that while this may not be unhealthy, it is nevertheless unpleasant. He says that Oakland, like San Francisco, is dependent for its supply chiefly on surface waters impounded in reservoirs during the rainy season. All such fresh water lakes are more or less subject to vexatious contaminations, due principally to the decomposition of some variety of *algae*. Whether these organisms give rise to unwholesome conditions is an open question. The Massachusetts State Board of Health say on this point, "that the plant acted mechanically chiefly, perhaps like unripe fruit, when affecting the health at all, in causing diarrhea, but that the filtered water is harmless." However true this may be, the fact remains that they give a repulsive appearance to the water, and, under certain conditions, impart to it a very offensive taste and odor. As to the remedy, there is absolutely no preventive known for these troublesome contaminations.

The experience at Baltimore is in brief as follows:

First—"The facts go to show that the products of decaying vegetation sink to the lower water in deep reservoirs, where decomposition is suspended for want of oxygen; the gases are absorbed by the water, which, upon contact with the air, are fully oxydized."

Second—"As a preventive, surplus waters should be wasted from the bottom of the reservoirs, and not over the waste weirs."

Third—"As a cure, aeration by means of shallow distributing reservoirs, receiving the water on the surface, and, if possible, from fountains."

This seems to show that a large proportion of the bad odors and tastes may be directly traced to stagnated waters in the lower reaches. Mr. Le Conte suggests that in the Contra Costa reservoirs the storm waters should be wasted chiefly through the bottom outlet, so the bottom waters should be allowed to run to waste occasionally. As to muddy waters, the only remedy is a system of capacious settling reservoirs.

WORKS and machinery to the value of \$100,000 will be employed in developing the recently discovered coal mine at Elsinore, San Diego county.

GEN. THOMAS H. WILLIAMS, well known as a mining man of considerable wealth, died last week.

Working Drift Mines.

A number of mines in this State, formerly worked by the hydraulic process, are now being worked by "drifting." In the Mint Director's report, Mr. Walter A. Skidmore contributes a chapter on gold and silver mining in this State, in which the method of working drift mines is well described.

The method of extracting gravel in drift mines is in many respects similar to that pursued in coal mining. A shaft or slope is sunk, or a tunnel run, if the nature of the ground will permit. When the pay gravel is reached it is cross cut from rim to rim and gangways are run at right angles, laying off the ground in blocks. These are called breasts. The main tunnel is always carried well ahead of the gangways. Pillars are left to support the main tunnel, which follows as near as practicable the gutter of the channel. The breasts are supported by temporary posts and by the "stacking" of the larger boulders. As breast after breast is worked the ground is abandoned and left to settle. Tunnels are sometimes run too low or too high; in the latter event the work must be commenced anew and at a more favorable point. If too low, an upraise shaft is raised until the gravel is tapped, when a main gallery is run above the tunnel bed, and the ground worked as above described, the gravel being dropped to the main tunnel by chutes.

In the accompanying diagram of a drift mine the main tunnel runs through the center and the gangways diverge on either side until the rim or limit of pay is reached. The main gallery or tunnel is usually 10 or 12 feet on bottom, 8 or 9 feet high, and 3 to 4 feet wide on the top; while the breasts are from 3 to 5 feet in height. Hence the area covered by the gallery and gangways bears a proportion in cubic contents to the whole ground worked.

Drift mines are rarely worked by perpendicular shaft, as the method is both inconvenient and expensive. Shafts are sunk to the bed-rock for exploratory purposes. When by means of drifts in various directions the extent and apparent course of the channel is determined, a tunnel is run if practicable. Some of these tunnels have been run a distance of 1 mile through the rim-rock before the channel has been struck, but this is never done unless a prospecting shaft or a neighboring tunnel has demonstrated the existence and value of the channel.

Where a tunnel is not practicable, or where a tunnel having been run a lower channel has been found below its grade, the ground is opened by incline or slope. Many effective and original devices are used for hauling up the loaded cars and providing ventilation. At the Bald Mountain Extension mine of Forest City, Sierra county, the incline is 260 feet in length with a pitch of 1 foot in 4, making the perpendicular rise 65 feet. The upper part of the incline, for a little more than half the length, has a double track; at the junction of the single and double tracks there is an automatic switch which is set by the descending loaded cars. The drum is two feet in diameter, and is 25 feet from the head of the incline. Two steel ropes, half an inch in diameter and each 300 feet long, are used, unwinding from the center of the drum towards the ends. The break used is an ordinary strap break, having a compound lever attachment, making it automatic to the extent that it will by its own weight hold two loaded cars on the incline. The whole outfit worked smoothly from the start, two loaded cars being lowered in about 30 seconds. The double shaft through which gravel was at first taken out has been utilized by placing in one of the compartments an air-blast. The air, which comes in through 6000 feet of 11-inch pipe, is taken by this air-blast down the 60-foot shaft and forced up and into the drifts and tunnels, bringing the works, so far as ventilation is concerned, for an indefinite period within the last-mentioned distance from the outer air.

A writer in the Downieville Messenger, who is evidently a practical drift miner, makes the following pertinent suggestions with respect to the future of this interest:

"In no other branch of mining has so little improvement been made upon the original and primitive methods as in drift gravel mining. It is true that in a few instances, notably in the

Bald Mountain mine, in this county, machinery is being used to cheapen and expedite the extraction of gold-bearing gravel, but with one or two exceptions the manner of working is substantially the same that it was almost in the beginning of the industry. In later days the tunnel is somewhat larger and less sinuous. The timbering is more substantial. It is usual now to use posts from 10 to 20 inches in diameter, and for special purposes a diameter of two feet is not uncommon. Caps range from 12 inches upward. The original method of making a nearly square tunnel has long been abandoned in the larger mines, and the custom now is to make the main tunnels at least 7 feet on the bottom, 6½ to 7 feet high, by 3½ feet at the top—all these measurements 'in the clear' or inside the timbers. A cross-section of a modern mining tunnel would thus present the appearance of a perpendicularly bisected truncated pyramid. The object of thus placing the posts is to prevent that rapid crowding in at the bottom in soft ground, which with a post set perpendicularly would ensue, entailing delay and ex-

Mining Accidents.

A miner named John Mitchell fell down the shaft at the Bunker Hill mine, near Amador City, one day last week and was badly hurt about the head, but the wound is not considered dangerous.

Richard Phillips, a Cornish miner, working in the Live Oak mine, at Soulsbyville, Tuolumne county, was severely injured by a piece of rock falling from above and striking him in the small of the back. The wounded man is in a critical condition.

Richard Hale was caved on in the Baltimore mine and received such injuries as proved fatal. He was at work in a tunnel when without a moment's warning the top seemed to fall and, knocking him over against the wall, the debris held him fast. His head and shoulders were not covered and it was hoped at first to get him out in a short time. Word, however, of the accident was sent to town and a number went out and joined in the work of rescuing him. As fast as the loose dirt and stones were shoveled

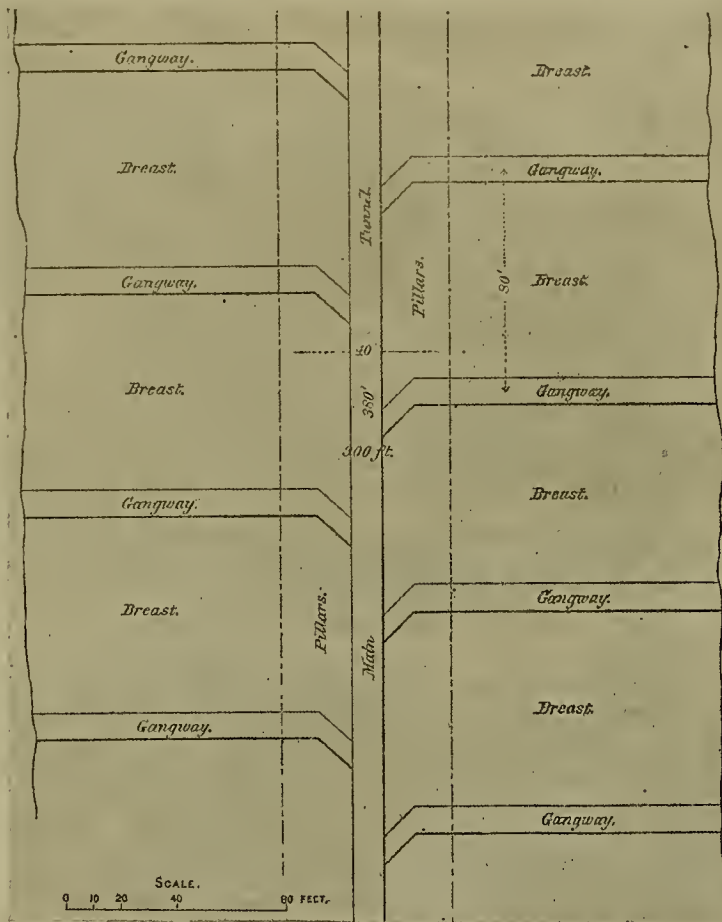


DIAGRAM SHOWING METHOD OF WORKING DRIFT MINES.

pense for repairs. Of late years, T-rail has come largely into use in mining tunnels. This rail is either steel or iron varying in weight from 16 pounds to the yard and upward for the former to from 24 to 42 pounds to the yard for the latter. The advantages of this rail over the strap rail laid on wooden stringers are numerous and essential. While the first cost is more, the wear upon wheels and car bodies is infinitely less, and the ease with which a car is moved is much greater. Another advantage is that in swelling ground this rail rises in long swells instead of sharp hummocks, the advantages of which in tunnels of moderate gradients are obvious. In the 'car' there have been some minor improvements, but that vehicle is substantially the same, being a box upon four wheels. From holding less than half a cubic yard, it has grown to hold a full cubic yard, weighing with its contents, when full, about 4000 pounds. Instead of wheels loose upon the axles, they are rigid, and the axles of steel turn in babbitted self-oiling boxes. Instead of the car being pushed by hand, mules are now used where the distance is great, each animal taking a train of eight cars, more or less, depending upon the gradients to be overcome. The foregoing are, in brief, the more important changes that have taken place in the evolution of drift gravel mining. In the economy of drift mining no inconsiderable expense attaches to moving the gravel from the inside of the mine to the dump."

back more fell down to take their place, and the rescuers soon found that they had no trifling job ahead of them. A general alarm was given and one or two hundred people in all went out to the mine in hopes of being able to render some assistance. A few practical miners, however, took the work in hand, and by putting in new timbers and working carefully and skillfully they finally succeeded in about seven and a-half hours after the accident, in bringing the unfortunate man out to the light of day. He suffered some pain, but no bones were fractured, and it was the general belief when they got him out he was not seriously injured. He was brought in and made as comfortable as possible. Towards morning, however, his pain seemed to grow less, and by 6 o'clock he was a corpse.

On Monday morning last the body of Frank Agnew was discovered by one of the employees revolving around a shaft at the Douglass mill, Dayton, Nev. The machinery was stopped and the body extricated, dead. How long it had been in that position is unknown. It evidently had caught in the machinery. The body was badly lacerated, the left leg being completely torn off at the knee.

The Granite Mountain mine, Montana, shipped in 1885 a total of 1059 bars of bullion, weighing 1,096,731 ounces fine silver, the estimated value being \$1,146,000, the proceeds in hand, all charges for freight and refining off, amounting to \$1,102,750.

A State Lottery.

California ought to have a lottery of its own, managed by a board of commissioners. There is nothing honest, decent, moral or improving in a lottery, but still this State should run one. There is everything dishonest, indecent, immoral and debasing in a State lottery, but still the State should have one of its own. Deal with things as they actually are and not with things as they should be. This State lottery should be established and conducted for the purpose of keeping at home the money now sent to New Orleans by the people of this State. That money has made the New Orleans managers very rich, enabling them to fly high at Saratoga and other watering places, and they build villas in many pleasant locations. California money ought to be given to California lottery managers. Some of our ex-State officers, whom juries pronounced innocent when said officers were tried for taking State mousy, would make excellent lottery directors. Very many California people do send their money away to the Louisiana concern, and this State should open a hogging game of its own to accommodate the gambling propensities of the good people here. An amendment, which permits lotteries in this State, should be made to our State constitution.—*Grass Valley Tidings.*

Yes; by all means, have a Golden State lottery. Advertisements in first-class daily papers show that Louisiana lotteries are capping us for a harvest. California has neglected her duty towards that great class of her citizens who forever want "something for nothing"—had rather receive \$1 without giving an equivalent than \$2 by honest enterprise.

California suffered once from the Mercantile Library lottery. No more demoralizing event ever occurred in the community. The lesson taught by that should be sufficient. Business was upset in San Francisco and the interior for weeks, and the "season" finally culminated in a three days' vacation at the metropolis. Thousands were ruined in finances and thousands more suffered in health, morals and industry. What mattered it that a good divine opened the ceremonies with prayer at the drawing of prizes in the Mechanics' pavilion, nearly 18 years ago, and that the president, treasurer, agent and several of the directors were of standing in the community and moral—not to say religious—men. They were all prominent and leading business men, yet the example set by them was demoralizing in the extreme. That few of them have since prospered, or are now with us, may not be a result of that grand money-making scheme, but it is a significant fact. It is true, this was not for the benefit of an individual, but of an association, and the association itself has not prospered from its ill-gotten gains.

BULLION HILL.—An "Old-Timer" writes us from Bullion Hill, Cortez, Nev., that all the mines are looking well and there are only four dead-heads on the hill. They have been lying idle for nearly a year trying to sell a little hunch of ore between two rocks, which is now in litigation. Our correspondent thinks they are not only injuring themselves, but every mine owner in the hill. The miners there that own good properties are not calling on capitalists to help them. They have an abundance of high-grade ore near the surface, which has paid the miners well for the past 20 years for their labor and will last for years to come. If many of the mines were in the hands of capitalists there would be thousands of dollars every month taken out of Bullion Hill, where the miners are now enabled to take out only a few hundred.

DEATH OF A WELL-KNOWN FOUNDRYMAN.—Thornton Thompson, proprietor of the Eureka Foundry, on Beale street, got off one of the cars of the Howard street line at Twenty-sixth street Tuesday afternoon, walked along that street toward his home at 2932 Folsom street, but before he reached Shotwell street he fell. He was carried at once to his house and physicians were summoned, but when they arrived he was dead. The physicians declared that he died of heart disease. The deceased was a native of New Jersey, 52 years old.

ANOTHER rich strike in the Ida gold mine at Lost Basin, 60 miles northeast of Hackberry, A. T., is causing considerable excitement, and prospecting outfits are leaving here daily for the new gold fields.

POLITENESS could not be carried further than it is at a certain coal mine in Dudley, where a notice warns all and sundry in the following terms: "Please do not fall down the shaft."

PRACTICAL HYDRAULICS.*

NUMBER 20. COPYRIGHTED.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

TO FIND THE MINIMUM MEAN THICKNESS.

Rule 50.—Multiply the fifth root of the product of the coefficient of resistance, the length of the pipe, the square of the discharge per second, and the fourth power of the mean hydrostatic ordinate, O A, Fig. 20, by the quotient arising from dividing 2.5908 by the modulus of the working load or of safety, as shall be required.

Rule 50 corresponds to Eq. (205).

TO FIND THE MINIMUM WEIGHT.

Rule 51.—Case 1.—The pipe being very thin, multiply the fifth root of the product of the square of the coefficient of resistance, the seventh power of the length of the pipe, the fourth power of the discharge per second, and the cube of the mean hydrostatic ordinate, O A, Fig. 20, by the quotient arising from dividing .4046 times the weight of a cubic foot of the material in the pipe by the modulus of the material.

Case 2.—The pipe being thick as $\frac{3}{16}$ of an inch or more, and seamless, multiply the result obtained, according to Case 1, by 1 (unit), increased by the quotient arising from dividing the thickness of the shell by the inner diameter.

Case 3.—The pipe being thick, as $\frac{3}{16}$ of an inch or more, and constructed with rivets and laps or bands, multiply the result obtained, according to Case 2, by 1 (unit), increased by their relative weight to that of the pipe.

Rule 51 corresponds to Eq. (211).

The moduli with respect to the strength, working load, and safety are given in Table 23.

The modulus of working load, as shown in Ex. 90, is $k=17,549$ pounds.

Unless the iron is extra in quality, the modulus ought to be less, as $k=14,000$.

The weight of a cubic foot of iron is usually estimated at 480 pounds.

TABLE 24.

Number, Thickness and Weight of One Square Foot of Sheet Iron.

BIRMINGHAM GAUGE.						AMERICAN GAUGE.—WASWELL.					
No.	Thi'k in.	Lbs.	No	Thi'k in.	Lbs.	No.	Thi'k in.	Lbs.	No.	Thick in.	Lbs.
0000	.454	18.35	17	.058	2.34	0000	.46	18.63	19	.036	1.45
000	.425	17.18	18	.049	1.98	000	.41	16.58	20	.032	1.29
00	.38	15.36	19	.042	1.70	00	.365	14.77	21	.028	1.15
0	.34	13.74	20	.035	1.42	0	.325	13.15	22	.025	1.03
1	.3	12.13	21	.032	1.29	1	.289	11.70	23	.023	.913
2	.284	11.48	22	.028	1.13	2	.258	10.43	24	.020	.814
3	.250	10.47	23	.025	1.01	3	.229	9.29	25	.018	.724
4	.238	9.62	24	.022	.889	4	.204	8.27	26	.016	.644
5	.22	8.89	25	.02	.808	5	.182	7.37	27	.014	.574
6	.203	8.21	26	.018	.723	6	.162	6.56	28	.013	.511
7	.18	7.28	27	.016	.647	7	.144	5.84	29	.011	.455
8	.165	6.67	28	.014	.566	8	.128	5.20	30	.010	.405
9	.148	5.98	29	.013	.525	9	.114	4.63	31	.009	.360
10	.134	5.42	30	.012	.485	10	.102	4.13	32	.008	.321
11	.12	4.85	31	.010	.404	11	.091	3.67	33	.007	.286
12	.109	4.41	32	.009	.364	12	.081	3.27	34	.0063	.254
13	.095	3.84	33	.008	.323	13	.072	2.92	35	.0056	.226
14	.083	3.36	34	.007	.283	14	.064	2.59	36	.005	.202
15	.072	2.91	35	.005	.202	15	.057	2.31	37	.0045	.180
16	.065	2.63	36	.004	.162	16	.051	2.05	38	.004	.159
						17	.045	1.83	39	.0035	.142
						18	.040	1.63	40	.0031	.127

Ex. 91.—The following data from a sheet-iron inverted siphon being given, viz:

Length of pipe, 128.5 miles.

Elevations with respect to sea level:
Point of inlet, 1300 feet.
Point of outlet, 350 feet.

Mean hydrostatic ordinate, as O A, Fig. 20, 305.5 feet; discharge of water per second, 37.57 cubic feet; modulus of safety of the iron, 14,000 pounds; weight of iron per cubic foot, 485 pounds; allowance for bands, laps and rivets, 15 per cent; cost of laid pipe per pound, 10 cents. Required, the minimum diameter, thickness of shell, weight and cost of the siphon? Required, also, the diameter, thickness of shell, weight and cost of the siphon, if 950 feet, the full hydraulic head, be employed?

Qul. 1st. The given hydrostatic ordinate is 305.5 feet.

By Rule 46, corresponding to Eq. (198), $305.5 \times 4 \div 3 = 407.34$ hydraulic head; $407.34 \div 128.5 = 3.17$ feet fall per mile.

By Table 17, it is seen that for 3.17 feet fall per mile, the pipe carrying 37.57 cubic feet per second will approximate 48 inches in diameter, and that the corresponding velocity is 3.20 feet per second.

By Table 16, for a velocity of 3 feet in a 48-inch pipe, the coefficient of resistance is=.0038.

By Rule 49, corresponding to Eq. (204),

$.5965 \left(\frac{.0038 \times 128.5 \times 5280 \times (37.57)^2}{305.5} \right)^{\frac{1}{5}} = 3.898$ feet = 46.776 inches, minimum diameter (internal).—Ans.

By Rule 50, corresponding to Eq. (205),

$\frac{2.5908}{14000} \left(.0038 \times 128.5 \times 5280 \times (305.5)^4 \right)^{\frac{1}{5}} = .3694$ inches in thickness.—Ans.

By Rule 51, corresponding to Eq. (211),

$\frac{.4046 \times 485}{14000} \left\{ (.0038)^2 (128.5 \times 5280)^7 (37.57)^4 (305.5)^3 \right\}^{\frac{1}{5}} (1 + \frac{.3694}{.48}) \times 1.15 = 143790750$ pounds, minimum weight.—Ans.

Whence at 10c. per pound: Cost=\$14,379,075.00.—Ans.

Cul. 2.—1300—350=950 feet total head; $950 \div 128.5 = 7.392$ feet fall per mile.

By Table 17, the diameter of pipe having 7.392 feet fall per mile, and discharge 37.57 cubic feet of water per second is=40 inches.

By Rule 47, corresponding to Eq. (190), $(305.5 \times 2 + 950) \div 2 = 780.5$ feet mean ordinate for the entire pipe.

By Rule 43, corresponding to Eq. (187), $780.5 \times .434 = 338.737$ mean ordinate in pounds for the entire pipe.

By Rule 44, corresponding to Eq. (188), $338.737 \times 20 \div 14000 = .4839$ inches thickness of pipe; $40 \times 3.1416 \div 12 = 10.472$ feet circumference of pipe; $10.472 \times 128.5 \times 5280 \times .485 \times .4839 \div 12 = 138954840$ pounds weight of pipe, assumed seamless, and estimated for the internal diameter.

By Rule 51, corresponding to Eq. (211), cases 2 and 3, $138954840 (1 + \frac{.4839}{.48}) \times 1.15 = 161,747,880$ pounds weight of pipe, employing the full head of 950 feet.—Ans.

Whence, at 10c. per pound: Cost=\$16,174,788.00.—Ans.

The difference in these results, viz., \$16,174,788.00—\$14,379,075.00=\$1,795,713.00, which amounts to a saving of over 11 per cent by the application of the principle hereinbefore demonstrated with respect to the minimum weight and minimum cost of an inverted siphon.

There will, in fact, be a greater saving in practice, arising from a less length of pipe under pressure, in case of employing the smaller head.

FLOW OF WATER IN OPEN CHANNELS AND NATURAL STREAMS.

The flow of water in open channels and natural streams is subject to the same laws which govern its flow in pipes. The force producing motion in the water, and overcoming the resistances of the water way, is that of gravity applied to an inclined plane. A greater variety of forms, with respect to cross section of streams, is presented in open channels and natural streams than in pipes, thereby changing to a greater extent the relations between the perimeters and the areas of the cross sections of the former, than of the latter. Thus, in the case of pipes, the "hydraulic mean radius" has been shown, uniformly, equal to one-fourth of the diameter, while in open channels their mean depths vary indefinitely.

The "mean depth" of an open channel or natural stream is the ratio of the perimeter to the area of the cross section of the stream. For the most part in hydraulic computations, that portion of the perimeter which bounds the bottom and sides of this area, termed the "wet perimeter," is employed.

The "air perimeter," whose value does not often exceed one-tenth of an equal length of the wet perimeter, unless strong winds or other disturbing influences obtain, is considered when great accuracy is required:

Let a =area of cross section of stream;

p =wet perimeter;

$m p$ =air perimeter;

m =coefficient of air perimeter;

r =hydraulic mean depth.

$$\text{Then } r = \frac{a}{p} \quad (212)$$

$$r = \frac{a}{p + m p} \quad (213)$$

Other things being equal, the greater the ratio of the perimeter to the area of the cross section of a stream of water, the less will be the resistance to flow.

The forms of cross sections, generally applied to water ways, are rectangular and trapezoidal.

FORM OF RECTANGLE OF MAXIMUM CARRYING CAPACITY.

Let p =perimeter (omitting air perimeter);

x =height of rectangle; *

Then $p-2x$ =width of rectangle.

$$\frac{px-2x^2}{p} = \frac{p}{4} = r, \text{ maximum.} \quad (214)$$

$$\text{Differentiating (214), } x = \frac{p}{4}, \text{ height.} \quad (215)$$

$$p-2x = \frac{2p}{4}, \text{ width.} \quad (216)$$

FORM OF TRAPEZOID OF REGULAR FIGURE OF MAXIMUM CARRYING CAPACITY.

In Fig. 21, let t =BAE, angle of slope of bank; $\frac{2}{3}$ =a side; then height= $\frac{2}{3} \sin t$. Mean width= $\frac{2}{3} + \frac{2}{3} \cos t$.

$$\frac{p^2}{9} (\sin t + \sin t \cos t) = r \text{ maximum.} \quad (217)$$

Differentiating (217), observing that $\sin^2 t = 1 - \cos^2 t$,

$$\cos^2 t + \frac{\cos t}{2} = \frac{1}{2}. \quad (218)$$

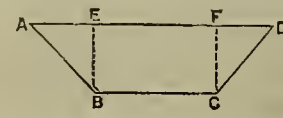
$$\text{Reducing (218), } \cos t = \frac{1}{2} = .5. \quad (219)$$

$$\text{By Table natural sines, } t = 60^\circ. \quad (220)$$

Of the regular figures, the semi-circle consisting of an infinite number of sides, so that at any point $\cos t = 1 = R$, offers the least resistance to flow.

By equations (215) and (216), it is seen that the form of a rectangle, offering the least resistance to flow, has its base or width equal to twice its height; and by equations (219) and (220), it is seen that of the regular figures, the trapezoid whose angle of slope is 60° , in other words the semi-hexagon, offers the least resistance to flow.

THE ANGLE OF SLOPE AND THE AREA BEING GIVEN TO DETERMINE THE MOST APPROPRIATE FORM OF A CANAL.



Let in Fig. 21, p =A B + B C + C D=perimeter; b =B C=bottom; t =angle A; n =cot t ; a =area; x =d=B E, depth of canal.

$$\text{Then } A E = n x; \quad (221)$$

$$A B = x(1 + n^2)^{\frac{1}{2}}; \quad (222)$$

$$p = b + 2x(1 + n^2)^{\frac{1}{2}}; \quad (223)$$

$$a = (b + n x) x; \quad (224)$$

$$\text{whence } b = \frac{a - n x^2}{x} \quad (225)$$

Substituting value of b of (225) in (223) and dividing then both members by a ,

$$\frac{p}{a} = \frac{1}{x} + \frac{x}{a} \left\{ (1 + n^2)^{\frac{1}{2}} - n \right\} \text{ minimum.} \quad (226)$$

Differentiating (226) and reducing,

$$x = \left\{ \frac{a}{2(1 + n^2)^{\frac{1}{2}} - n} \right\}^{\frac{1}{2}}. \quad (227)$$

Substituting the values of $n = \cot t = \frac{\cos t}{\sin t}$ and $(1 + n^2)^{\frac{1}{2}} = \frac{1}{\sin t}$ in (227),

$$x = \left\{ \frac{a \sin t}{2 - \cos t} \right\}^{\frac{1}{2}}. \quad (228)$$

$$\text{From (225) } b = \frac{a}{x} - x \cot t. \quad (229)$$

TABLE 25.

Dimensions of the most suitable forms of Canals, corresponding to different angles of slopes, and to a given area of cross section.

Angle of Slope=t.	Ratio of Per. to Base.	Relative Slope. n.	Depth. $\frac{d}{1}$	Bottom Width. $\frac{b}{1}$	$\frac{n d}{1}$	Top Width. $\frac{b + 2 n d}{1}$	Perimeter. $\frac{p}{1}$
90° 00'	1 on 0	.0	0.707	1.414	.0	1.414	2.828
75° 41'	5 on 1	0.200	0.734	1.217	0.147	1.510	2.713
75° 58'	4 on 1	0.250	0.734	1.161	0.186	1.533	2.692
71° 34'	3 on 1	0.333	0.732	1.079	0.251	1.580	2.656
63° 26'	2 on 1	0.500	0.759	0.938	0.379	1.697	2.635
60° 00'	26 on 15	0.577	0.760	0.877	0.439	1.755	2.632
56° 19'	3 on 2	0.667	0.759	0.812	0.506	1.824	2.635
53° 8'	4 on 3	0.750	0.757	0.753	0.568	1.892	2.645
51° 20'	5 on 4	0.800	0.753	0.724	0.603	1.960	2.654
45° 00'	1 on 1	1.000	0.740	0.613	0.740	2.092	2.704
40° 00'	21 on 25	1.192	0.722	0.525	0.860	2.246	2.771
36° 52'	3 on 4	1.333	0.707	0.471	0.943	2.557	2.828
35° 00'	7 on 10	1.402	0.697	0.439	0.995	2.430	2.870
33° 41'	2 on 3	1.500	0.689	0.418	1.034	2.465	2.989
30° 00'	23 on 40	1.732	0.664	0.356	1.150	2.656	3.012
26° 34'	1 on 2	2.000	0.636	0.300	1.272	2.844	3.144
21° 48'	2 on 5	2.500	0.589	0.228	1.471	3.170	3.397
18° 26'	1 on 3	3.000	0.548	0.188	1.645	3.478	3.646
14° 2'	1 on 4	4.000	0.485	0.119	1.941	4.001	4.121
11° 19'	1 on 5	5.000	0.441	0.062	2.205	4.472	4.519
semi-cir.	.....	.....	0.798	.....	.....	1.596	2.507

Notices of Recent Patents.

Among the patents recently obtained through Doney & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

TRACK-CLEAKER FOR MOWERS.—James M. Patterson and Eli A. Hinebanch, Tipton, Tulare Co. No. 335,769. This improvement in mowing machines consists particularly in the employment of vertical reciprocating sickles or cutters operating at the end of the horizontal finger-bar and in line with the track-cleaver, of a novel construction of these vertical cutters, a means by which they are actuated, and in certain details of construction.

DESIGN FOR CHEEK-PIECE FOR BRIDLE BITS.—Jose M. Espinosa, S. F., assignor to Wm. Davis. No. 16,521. Dated February 16, 1886. This invention relates to a design for the cheek or side pieces of a bit, the essential feature of which is the figure of a running or rearing horse, having rings or loops formed integral. The outer surface of the piece has lines of ornamentation upon it indicating or delineating the various features of a horse—such as the eye, nostril, mouth, mane, etc.

ELECTRIC TRUSS PAD.—Andrew T. Sherwood, S. F. No. 335,639. Dated Feb. 9, 1886. This is an elastic truss pad, combined with a galvanic battery, whereby the advantages of an electrical current are combined with the advantages to be derived from an elastic truss-pad, as distinguished from a hard or solid pad. The invention covers the particular means employed for connecting the poles of the battery through an elastic pad with the battery, whereby the elastic quality of this pad is not impaired or interfered with.

STAVE-JOINTING ATTACHMENTS FOR MOLDING MACHINES.—A. M. Jewell, S. F. No. 335,756. Dated Feb. 9, 1886. The invention consists in a pressure mechanism acting constantly against the sectionally-moving cutter head arbor and adapted to hold the guiding disk of the cutter-head to a positive engagement or contact with the pattern, whereby said head is caused to form or joint the stave. The object of the invention is to adapt by simple and effective means a molding machine for the purpose of joining or making staves.

FRUIT JAR FASTENING.—Georgs V. Henrie, S. F. Assignor of one-half to Martin V. B. Watson. No. 335,754. Dated Feb. 9, 1886. The invention relates to that class of fruit jar fastenings in which a wire nail hinged at one end to the neck-wire passes over the top of the jar and is fastened to and disconnected from the neck wire by a thumb piece or lever. The invention consists in a novel connection between the lever and neck-wire, and between said lever and the nail wire, whereby the latter may be readily engaged and disengaged. It further consists of an improved loop for securing and lightening the ends of the neck-wire and in a means for applying a greater or less pressure to the cover as may be required.

ELECTRIC BELT AND TRUSS.—A. T. Sherwood, S. F. No. 335,638. Dated Feb. 9, 1886. In a former patent of the same inventor is described an electric truss pad combined with a galvanic battery which formed an integral part of the pad. In this invention, however, is contemplated the employment of an independent electric belt, such as is used for therapeutical purposes, in connection with a truss pad and belt, and so combining and connecting the two that the electric current generated in the battery of the electric belt is passed through the truss pad and used for an adjunct for healing rupture. These belts are independent of each other, so that either can be worn separately; or when desired, they can be connected so as to act conjointly.

MACHINE FOR MAKING THREAD ON SHEET METAL PIPES.—F. F. Voigt, Walla Walla, W. T. No. 335,727. Dated Feb. 9, 1886. The object of the invention is to prepare for jointing such metal pipes as are made in sections, and are then put together to the required length, such as conducting water pipes and common water pipes or such as are used in leading water and draining, and stovepipes and smokestacks of smaller sizes. By the use of this invention the putting together or jointing of such pipes is rendered more easy, and when so put together they will stay without being tied with wire, or being riveted together or otherwise secured, it still being easy to separate the several sections and parts when necessary.

VOLTAIC BELT.—Andrew T. Sherwood, S. F. No. 335,637. Dated Feb. 9, 1886. This improvement in electric belts related, first, to an improved manner of constructing and combining the plates of different metals, such as zinc and copper, and the interlying fibrous substance, which compose the separate elements of a voltaic battery, and the manner of connecting these elements together, so as to form a battery, which is capable of generating an electric current for therapeutical purposes; and, secondly, by the covering belt, which supports and envelopes the batteries, to protect the clothing of the wearer from being soiled by the exciting liquid which is used for saturating the fibrous material. It also consists in a means for connecting the ends of the belt and in certain details of construction.

USEFUL INFORMATION.

DRY ROT.—A rather singular accident recently took place in Chicago, where a four-story brick building collapsed, the whole interior falling into the cellar. The weakness of the structure was first observed by a boy, who saw a movement in the wall, and told the engineer, but was laughed at for his pains. Soon afterward, however, an alarm was raised, and all the persons in the building succeeded in escaping before it fell. The cause of the catastrophe is said to have been the dry rotting of the wooden girders, where they rested upon the posts. The building had been examined not long before, and pronounced safe, and it seems possible that the rotting of the timber may have been caused by painting it while green, and that the same coat of paint may have served to conceal the ravages of the fungus from those who inspected this work. Paint, which prevents the drying of the corruptible sap of green timber, is a common cause of decay, while the contact of the end grain of one piece with the side of another, as in the case of a girder resting on a post, is an equally common one, so that the safest way in buildings framed with such timbers is always to rest the horizontal pieces on iron caps or brackets, and to avoid painting until the work has become seasoned by years of use.—*Western Architect and Builder.*

TO DWARF A TREE.—A little white oak tree, growing in an ordinary flower-pot, makes a very pretty ornament for a window or a front yard. It is very easily grown. Select a sound white oak acorn in January or February, plant in rich earth in a flower-pot, keep it in a warm place and well watered. In the spring, the little oak will make its appearance, and will require no care, except watering, and will withstand the winter if not too exposed to hard freezes. If the tap root is cut off in the early part of the next spring it will continue to grow and put out new limbs, but will not get much taller, and by cutting back the central roots that will spring from the base of the tap root every spring, a few years will produce a diminutive little oak, a *fac simile*, in appearance, to the lord of the hard woods. Some enthusiastic lovers of nature make veritable pets of these dwarf oaks.—*Southern Lumberman.*

ROME WAS BUILT OF BRICKS—NOT MARBLE.—There is a very false notion abroad as to the richness of the materials used for building in Rome, induced by the inflated accounts of travelers and poets, who attempt to disguise their ignorance or their want of knowledge and taste, by raving of Vitruvian proportions and marble temples, palaces and baths. The truth is, that Rome was built not of marble, nor even of stone, but of brick; for in comparison to the quantity of brick, it may be safely asserted that there is more stone in London than there was in Imperial Rome. Almost all the structures of the Romans, indeed, were of brick—their aqueducts, their palaces, their villas, their baths and their temples. Of the present remains it is only a few columns, and their entablatures that are of marble or granite, and two or three buildings of travertine stone; all the rest are brick.

APPARATUS FOR DETERMINING VALUES OF LUBRICANTS.—An interesting little device for determining the values of various lubricants is described in an English paper. It was designed by Professor Hermann, and consists of a perfectly cylindrical shaft supported on two journals carried by a branched support, which so turns on a hinge that the shaft can be adjusted at an angle of 5 to 10 degrees to the horizon. The upper end of the shaft is rotated by means of a handle. To use the apparatus a bent piece of the same metal as that to which the lubricant is to be applied is placed astride of the shaft and suitably weighted, and the number of turns of the handle requisite to cause it to slide along the shaft with various lubricants are noted. The greater the distance traveled for a given number of revolutions the more efficient the lubricant.

A HOME-MADE TELEPHONE.—To make a serviceable telephone from one farmhouse to another, only requires enough wire and two cigar boxes. First select your boxes, and make a hole about half an inch in diameter in the center of the bottom of each, and then place one in each of the houses you wish to connect; then get five pounds of common iron stovepipe wire, make a loop in one end and put it through the hole in your cigar box and fasten it with a nail; then draw it tight to the other box, supporting it, when necessary, with a stout cord. You can easily run your line into the house by boring a hole through the glass. Support your boxes with slats nailed across the window, and your telephone is complete. The writer has one that is 200 yards long, and cost 45 cents, that will carry music, when the organ is playing, 30 feet away in another room.—*Ec.*

A COVER FOR COAL CARS.—A very useful device in the shape of a cover for coal cars has recently been invented. The cover, which is made of corrugated iron, is attached to the side of the car by means of substantial hinges, and when not in use hangs along the side of the car. But when the car is filled and ready for shipment the cover is easily raised up and let down over the loaded car just as you would close a double door, the two sections are then

sealed, and if anyone breaks the seal for the purpose of stealing the coal he is guilty of burglary just the same as when breaking into a house or a sealed box car. It will be observed that this device will prevent coal from rolling off, keep snow and rain out of the car, and at the same time keep the coal thief at bay.

GLUCOSE FROM OLD RAGS.—It is said that a German manufacturing firm is turning out a ton a day of glucose, made from old linen rags which are treated with sulphuric acid, which converts them into dextrine, and then into glucose. As glucose is used extensively in the manufacture of lager beer, the possibility of drinking other people's underclothes, suggested by the new process, is interesting, if not appetizing.

STAINS may be removed even from the most delicately-colored kid gloves without injury by suspending them for a day in an atmosphere of ammonia. Provide a tall glass cylinder, in the bottom of which place strong aqua ammonia. Be careful to remove from the sides of the jar any ammonia that may be splattered upon them. Suspend the gloves to the stopper in the jar. They must not come in contact with the liquid.

ARTIFICIAL MARBLE can be made by soaking plaster of Paris in a solution of alum; bake it in an oven, and then grind it to a powder. In using, mix it with water, and to produce the clouds and veins stir in any dry color you wish. This, says an exchange, will become very hard and is susceptible of a high polish.

THE BAROMETER AND MINE EXPLOSIONS.—In certain Austrian coal mines work is suspended in dangerous places during a fall of the barometer, experiments still in progress having shown that the quantity and intensity of explosive gases greatly increase as the atmospheric pressure diminishes.

ONE of the English railroad companies has supplied all its employees with red neck handkerchiefs, the wearing of which is compulsory. The object is the providing of red flags, which can be employed in the event of any sudden accident or the derangement of the regular signals.

ANY gold jewelry that an immersion in water will not injure, can be beautifully cleaned by shaking it well in a bottle nearly half full of warm soapsuds, to which a little prepared chalk has been added, and afterwards rinsing in clear, cold water, and wiping it dry.

FIRE PROOFING SHINGLES.—It is said that shingles may be made fire proof by setting the huts into a trough of water, in which a half bushel each of lime and salt, and six pounds of potash have been dissolved.

GOOD HEALTH.

Increase of Baldness.

It has been estimated, says the *New York Medical Record*, that one-half the adult men of American birth living in our cities are bald-headed. The estimate is not exaggerated, if it is applied to persons above the age of thirty, and it may be rather under the mark. If, now, it be conceded that one-half our American business and professional men are bald at the present time, it would be interesting to speculate as to the condition of the heads of their descendants some hundreds of years from now. The probabilities point towards a race of hairless Americans, for baldness is extremely liable to be propagated in the male line, and to appear a little earlier in each generation. The American nation is threatened with the catastrophe of a universal alopecia. The cause is usually imputed to the excessive strain and ceaseless mental and physical activity to which our methods of business and modes of living conduce. From the visitors' gallery of the stock exchange, for example, one views a mob of shining pates, belonging, as a rule, to rather young men.

The much neglected scalp should be thoroughly cleaned at certain intervals. It should be carefully and regularly examined, and if it be unhealthy, dry, and scurvy, the proper applications should be made to it. The wearing of unventilated hats is one of the greatest sources of failure of nutrition of the hair, and these must be avoided. The beard never falls out, because it gets plenty of sunlight and air. These are what the hair of the scalp needs also. Women are less bald than men, because, for one reason, their scalps are better ventilated. In fine, civilization has made the hair-producing organs of the scalp delicate and feeble. They have to be nursed and cared for, or they disappear. Young Americans who do not wish to lose their hair before they are forty must begin to look after their scalps before they are twenty.

CONSUMPTION IN CALIFORNIA.—The published weekly death-rate of the cities and larger towns of California show quite a large percentage of deaths from consumption. A contemporary justly remarks that these publications without proper explanations do great injustice to the State. The deaths no doubt actually occur, but the greater number of the fatal cases have their origin in the East. People with very weak lungs remove to California in the hope of escaping the disease, and numbers

in all the stages of actual attack flee to our State in the hope of being cured. These settle here with the seeds of consumption already sown; many die, and add to our death-rate a percentage which we properly should not be charged with. Authorities agree that consumption is not to be classed as a disease which finds a home here as it does in the East, and therefore to incorporate the deaths of those who come here in the search of health in our death-rate, does the State an injury unless it is explained. Those who are well posted in regard to this subject, in those Southern countries of the State, well know that a very large proportion of the consumptives who visit this State are greatly benefited by the climate there, and many who would undoubtedly find an early grave in the Northern and Eastern States receive permanent benefit in an almost if not full restoration to health. The editor of this column pays frequent visits to the counties named and is personally cognizant of many cases of restoration.

INOCULATION FOR YELLOW FEVER.—Since M. Pasteur's announcement of his discovery of a method to prevent hydrophobia by inoculation, the subject of inoculation is receiving the special attention of the medical profession of this country. A belief prevails that yellow fever can also be prevented by inoculation. Dr. Holt, of the Louisiana Board of Health, in a letter to Dr. Sternberg, surgeon of the United States army, proposes the formation of a commission to visit Brazil and Mexico for the purpose of investigating certain experiments made in these countries in the inoculation of yellow fever patients. The physicians who have been conducting these experiments are Dr. Carmona in Mexico and Dr. Freire in Brazil. Their operations, it is said, have received the approval of their respective governments, and it will be the duty of the commission to find whether that approval was properly bestowed, and to what extent. A commission of that kind, it will doubtless strike the reader, should be appointed without delay.

OIL OF MUSTARD SEED FOR RHEUMATISM.—London *Truth* tells of a gentleman, who, after suffering much from the effects of rheumatism discovered that there is a green oil in mustard seed, which cures it. When he made his discovery, he, as he was a benevolent man, left in his will directions that this oil should be extracted and extensively advertised, but never sold; it should be given away to all who applied for it. Numbers of poor people get it, and are cured of their rheumatism. The writer says: "How I know about it is because a lady told me that she applied for it whenever she felt a twinge, and it acted like a charm. It is a green-colored oil, and I daresay, if it were sold instead of being given away, everybody would use it. Some people are too proud to ask for it; others don't believe in anything that costs nothing, so they go on having rheumatism."

BRAIN WORK NOT FAVORABLE TO INSANITY.—The following is from the *British Medical Journal*: Does excessive brainwork tend to the induction of insanity? In general the answer to this query by professed alienists is that mental work pure and simple, does not tend to the induction of insanity. But the proposition is not so fully established but that additional proofs are very welcome. Dr. O. Ewart, in the *American Practitioner*, gives the result of his large experience. From 1870 to 1876, he admitted into the general Insane Asylum in Ohio, 1204 patients. Of these but seventeen had received an academic education. Only twenty-five professed to be professional men.

PRIZE FOR AN INSTRUMENT TO RELIEVE DEAFNESS.—From the *Boston Medical and Surgical Journal* we learn that Baron Leon de Lenval, of Nice, has offered a prize of 3,000 francs for the best readily portable instrument, constructed according to the principle of the microphone, for improvement of hearing in case of partial deafness. The committee consists of five eminent physicians residing in Germany, Austria and France, of whom Prof. Hagenbach-Bischof of Basle is chairman. The prize will be awarded at the Fourth International Congress for Otolaryngology to be held at Brussels in September, 1888.

DROWNING AT SEA.—A person who will throw himself on his back in the water, with his hands held clasped in each other at his back, and with his head thrown back so that the nose and mouth may protrude from the water, may float for hours and cannot sink in that position. A common feather pillow tied around under the arms is said to be worth half a dozen India rubber life preservers, while a common mattress placed on a blanket, a trunk on the mattress, then both trunk and mattress tied up in the blanket and all thrown into the water together will float with the tide for many hours.

HOW TO CURE STAMMERING.—A correspondent of the *Scientific American* says if a person in the habit of stammering will always fill his lungs with air by a strong inhalation before he begins to speak, he may very readily cure the most obstinate case of that trouble. At least that is the personal experience of the correspondent.

FOR CHILBLAINS the *Lyon Medical* advises that the parts affected be bathed twice a day, 10 minutes at a time, with a mixture of half an ounce of sulphuric acid and one quart of water.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MISCELLANEOUS.—The Bunker mill is now running only 20 out of the 40 stamps. The reason assigned for this reduction is that the ore is of a very low grade, and 20 stamps have been hung up temporarily to enable the mine to be opened up so as to get ore of a better quality. Twelve men have been laid off for a while in consequence of this change. In the North California the ore-body, reported to be 20 feet wide, has shown a decided improvement of late. All the sulphurets from the Amador Queen mine have been hauled to the reduction works at Sutter Creek. The pile consisted of 120 tons, of unusually low grade, on account of carrying so much sand. The 3-stamp mill of the St. Luis mine, near Pine Grove, is kept running steadily. The rock averages about \$75 per ton, and the mill gets away with a trifle over one ton per stamp every 24 hours. The ledge is small, and this is the most serious drawback to the success of the enterprise, as a great deal of other rock besides ledge matter has to be broken and removed in order to secure working room. The proceeds, however, are equal to the running expenses, and if the ore-body should expand it would at once become a good paying property. The Amador Queen mill is running to its full capacity. There is a large amount of rock broken, ready for crushing. We learn that the daily cleanup of the plates averages about 50 to 60 per ton, which with anything like a fair yield in the batteries, and the saving of concentrates, ought to pay very well. At Coal Mine No. 3 work is being vigorously prosecuted. From four to six carloads are gotten out daily. The mine shows flattening prospects, the coal deposit increasing in quantity and improving in quality the further it is explored. Negotiations are in progress for the sale of the Matson mine, at Buena Vista, owned by J. W. Brown and D. D. Matson. The intending purchasers are parties in San Francisco. Two tons of ore were forwarded to the city on Wednesday for treatment, and if the result comes up to expectations, a sale will no doubt be effected. A small seam of quartz was cut in the big tunnel at Middle Bar a few days ago. The strike is not considered of much importance. The header is now within 50 feet of being underneath the Mammoth workings. If the rich ore of the Mammoth extends deep, the fact ought to be demonstrated within the next week or two.

SUTTER CREEK.—Amador Ledger, Feb. 27: Eight teams are now hauling wood to the Mahoney. They want at least 20 cords on hand before they feel safe in tackling the drainage of the shaft. At the Lincoln 30 stamps of the mill are kept going steadily, with enough ore in sight to keep the same number of stamps in motion for six or eight months. The Iowa mill started two weeks ago and is likely to run for three weeks longer. No new developments at the Eureka; drifting is still in order. The work of getting the compressor in position at the South Spring Hill is progressing rapidly. The foundation is about completed and they expect to have the machine running in a couple of weeks.

ZELIE.—Amador Ledger, Feb. 27: At this mine they are having considerable difficulty with water. The water rose in the shaft and damaged the timbering to such an extent that the lower portion has to be retimbered. In the lower level, the work of taking out ore had to be suspended for several days, laying off a number of men until the repairs were made. Some of the stamps had to be hung up in the meantime, from 15 to 20 stamps being kept running on rock from the upper levels. The Zelie mill was brought to a standstill entirely on Thursday. The cave in the shaft is a serious matter and there is no telling how long it will take to repair it. W. Borkall has resigned the night foremanship, and James Harvey has taken his place.

Calaveras.

MIKE BONDED.—Calaveras Union, Feb. 24: The Oneto and Baranini quartz mines in Middle Bar mining district, owned by Jos. Oneto and Baranini, were bonded on Monday last to Israel W. Knox, of San Francisco for six months. A sum of money was paid down, and eight thousand dollars more is to be paid if the mines are taken. A tunnel is to be put long has been commenced in the Oneto mine, to tap the vein at a low level.

GOOD PROSPECTS.—Mt. Echo, Feb. 26: The Etna mine, situated about five miles northeast of Copperopolis, was located in 1853 and is now owned by the "Pine Log Co." Mr. John F. Carter, the present superintendent, informs us that the mine looks well and the prospects for it becoming a permanent and paying property is very flattering.

COPPER, POLIS.—There is some hope of a revival of the mining interests of this place. Several mining prospectors who are experts at the business have been prospecting this vicinity with considerable success. There are good mines both of gold and copper to be found here. All that is needed to cause this place to become a busy mining center is capital and energy.

Fresno.

NEW MINES.—Republican, Feb. 24: On Monday we were favored with a call by Mr. Peter Gortley who is engaged in opening up a most promising vein of gold-bearing quartz on Willow creek, in the recently organized mining district of Fresno, in the northern portion of this county. The location of this claim was made by Mr. Gortley in December, and during last month he faced an open cut to a sufficient distance to expose the ledge for a distance of nearly 30 feet. The ledge at first only showed a thickness of two inches, but at the end of the cut a mass of eight inches in width. The lead is in talcose slate and porphyry, the vein matter being so much decomposed that it is almost impossible to find a piece of hard quartz larger than a man's hand. The vein is extremely rich, both in free gold and gold-bearing sulphurets. Many locations have been made recently in this portion of Fresno county, and San Francisco speculators have secured considerable promising leads.

Inyo.

LOOKOUT MINE.—Independent, Feb. 24: The lower and upper Lookout mines are looking up. At Darwin and Lookout mining matters have not been so promising

in several years. The Defiance mine is now being well opened up, and the ore body found before the close of the past year is seen to be one of great extent and value. Mr. Reddy is still detained in San Francisco, being engaged as counsel in several important lawsuits. As soon as he can get a chance to go to Darwin, lively times may be expected at the Defiance. The recent strike at Lookout promises to be of equal importance; indeed, present indications are that this is a still larger ore body than the Defiance. A little more work at Lookout will open new ventilation, and enable Mr. Fitzgerald to extend operations there. The report of Mr. Gash on the marble quarry at Swansea is most favorable; in fact, the architect is enthusiastic over the fine quality and great extent of the quarry. There is every reason to expect that a large number of men will be employed there soon. Mr. Tom Boland still has a large force of men employed at Cerro Gordo. At Beveridge preparations are being made for a busy season, and a good deal of mining will be done there this summer.

MINING AT SALINE.—In Saline valley, east of the Inyo mountains, there are a great many mining locations, many of which contain fine prospects, but the difficulty of reaching the mines hinders their development. Billy Grant crossed the mountains yesterday, to work on some claims he has there. He has already done about five thousand dollars worth of work at the place. He has seven mining locations, and has already opened five ledges that go from two to four feet in width. The ore carries no lead, it is all chloride, born or native silver. Much of the ore goes as high as \$1800 a ton. Mr. Grant says there is plenty of wood and water close to the mines. From Big Pine station on the C. & C. railroad, there is a passable wagon road to all the mines, a distance of 65 miles. The country is quite unknown, except to a few prospectors, but these have done enough to prove that there are big chances for opening up valuable mines. A run of 70 tons of ore from the Chubasco mine, Beveridge district, is about completed.

LOOKOUT MINE.—Inyo Independent, Feb. 24: Three or four weeks ago an important strike was made in the Lookout mine, near Darwin. Report of the strike was delayed until the ore body should be opened up to some extent; this has now been accomplished and it is discovered that the deposit is of greater extent than had been expected, or even hoped for. Some difficulty was at first experienced in opening up the ore body through want of sufficient ventilation; but a fan and air pipes put in last week has remedied that trouble. All of the ore hitherto taken from the mine has been smelted at Lookout, but the ore of this recent strike is so much richer than any found in the mine before that Mr. Fitzgerald proposes making a trial shipment direct from the mine to San Francisco.

CLEVELAND MINE.—A run of ore from the Cleveland mine, at Fish Springs, was finished up at the beginning of the week. The ore yielded within a fraction of \$67 a ton in gold. In addition to the gold cleaned up a lot of rich sulphurets were saved and will be sent to San Francisco. Ore is now being got out for another run.

Monterey.

THE NEW CAMP.—Cor. Index: Your correspondent has been out to the new mining camp. H. F. Melville was found digging away at the start of a proposed tunnel, on what he terms a spur of the main ledge, making a cut about four feet wide and straight in under the top of the hill. There had not been work enough done to give an idea of what could be expected underneath. A town site has been located about a quarter of a mile from where they are at work at the foot of the hill, and on the banks of a would-be stream. Water is scarce except from seepage. Several claims have been staked out. Several of the business men of this town were seen up in the mining locality, but they disclaim any interest in the excitement. Reports from those interested indicate rich developments in a few days.

Nevada.

THE COE MINE.—Grass Valley Union, March 3: The Coe mine, which is now leased by James Theteway is very likely to be a good property in the near future. The old eastern shaft has been freed of water, and the drift, at the depth of 50 feet, is nearly cleared of rubbish and dirt. The ledge, at this point, is quite large, and some rock taken from it yesterday showed well in free gold. The general character of the rock is good, and the lessee is sanguine of his success. The drift will be continued eastward to the Pomeroy ground, which will give that company a good idea of what they have beneath the surface, as the drift can be continued and an upraise made at a small expense. It will be but a short time before the Coe will be taking out and milling good paying ore.

Placer.

ROCKLIN.—A. D. Hathaway has obtained a contract to furnish the granite for J. C. Flood's new building in San Francisco. It will necessitate the employment of 30 or 40 men in the quarries for some months. The Lee mine two and a half miles southeast of Rocklin, on the old Bradley place, is now the center of attraction to many people. It has lately passed into the possession of gentlemen who have ample means to develop it, namely Messrs. Chabot, Wall and Burdison, of Oakland. They are now putting up a ten-stamp mill. The Laird mine, two and a half miles south of Loomis, is also doing well. It belongs to a company, Mr. Laird being the principal stockholder. There is said to be enough surface gravel there to keep the present force about 12 men at work for many years to come. Half a mile south of the Laird mine is the Roadley mine owned and operated by Geo. T. Roadley, the well-known veteran locomotive engineer on the Sacramento division of the U. P. R. R. It is reported to be doing very well.

IOWA HILL.—Placer Argus, Feb. 26: Rich gravel has been struck in the Morning star mine, and the general public, as well as the parties most directly concerned, are jubilant. The main tunnel is 100 feet. At the end of that tunnel an upraise of 10 feet was made, and another tunnel was run under 100 feet into the gravel. Jan. Pascoe is the superintendent. Hon. J. E. Nod's one of the principal owners of the mine. J. E. Pascoe's drift mine on Independence hill is panning out well. Last week 3000 worth of nuggets was picked up by say nothing about the much larger quantity of finer stuff. One of the lumps weighed six and a half ounces, another five and a half ounces. H. Root-

man & Co. are at work on Prospect hill, and have strong hopes of striking a rich channel, which all the signs indicate to be there. The mine was formerly worked by hydraulic methods, and it was always a good paying claim. About four men are employed there now.

Plumas.

BIG FLAT CLAIMS.—Greenville Bulletin, Feb. 20: In the vicinity of Dutch Hill in the North Fork country, there is a long strip of comparatively flat ground capped with lava of varying thickness. Under this is an ancient channel of gravel. The present river cuts across this channel in one place, exposing the gravel to view. The strip of land is known as Big Flat, and reaches down to the Sunny-side mine, a distance of three miles or more. Claims have been located the entire length almost, and the development of the channel is being prosecuted. The series of claims consists of the Glazier, Cameron, Horner, San Jose, Alum Cove, and the Golden Curry. The Pliocene consists of 100 acres, and is the upper end of Big Flat, being cut off from the main body by the North Fork of Feather river. The ancient channel runs through the central part of the claim. The owners have run a tunnel up the channel about 100 feet. They will soon crosscut for the pay lead. The bed of gravel is supposed to be 250 feet wide on top, and about 30 feet deep. A lava cap 500 feet thick lies on top. There is gold in the tunnel now. Below the Pliocene and on the opposite side of the present river and on the line of the ancient channel, is the Glazier claim, the upper end of which is now being worked, and report says that it is now paying fully an ounce daily to the hand. It is certain that large profits are being reaped by the owners. A new tunnel is being run lower down on the channel in order that the claim may be opened up at greater depth and more extensively. The Glazier consists of 120 acres, and is about three-fourths of a mile long. A tunnel is being cut through the rim of the Cameron claim to tap the gravel. It is thought that it will be necessary to run seven or eight hundred feet to reach it. The next in order are the Highland Chief and the Horner, embracing seventy and forty acres respectively. The owners are running tunnels to cut the channel, which is also the case with the next location, the San Jose. The Alum Cove and the Golden Curry are owned by one man. From a break in the latter a large amount of gold was extracted last year, the sum being estimated at \$15,000. The exact amount, the owner has not made known. The rich lead was lost, however, but a diligent search for it is now being made. Adjoining Big Flat, a claim is worked by Messrs. Bressler, Ellis and Firmstone. It is situated about one-half of a mile below the Dutch Hill mine, and it is supposed to be the outlet of that channel. One tunnel was driven in, but it caved. Now another is progressing with good prospects of reaching pay gravel at an early date.

NEW OPERATION.—The late developments in the Indian Valley mine are inspiring owners of other properties with increased vigor. Work has already been commenced on the old Crown Point, under the management of J. P. Hall who has become interested in the mine, he being the owner of one-fourth of the property. We learn that some very rich ore was taken out of the Crown Point years ago by Mr. John N. Elrod, but the lead was lost. Mr. Elrod spent several thousand dollars running tunnels, and so great was his confidence in the mine that he obtained a patent for it. The Ophir Consolidated, owned by Mr. Hall, and adjoining the Crown Point, was not discovered until after Mr. Elrod's time, and the course of that vein would cross the Crown Point about parallel with the tunnels formerly run. Consequently a tunnel has been started on the Crown Point, and it is to be run at nearly right angles to those formerly run on that property. The course of this tunnel bears to the north center of the Ophir Consolidated. The arrangement which permits this work is important, as by it both mines can be operated successfully together. If the developments in the Crown Point are what is expected, the two locations will be one of the best mines in the district.

RICH STRIKE.—Plumas Natural, Feb. 24: One of the richest veins of quartz ever discovered in northern California has been opened at Mohawk, this county. It equals in richness the famous Edman mine at Eagle gulch. The ledge is known as the Valentine, and is owned by Neseman & Sons, J. B. Senon, of Mohawk, and J. Stephens, of this place. The find has raised great excitement in that mining district, and there will likely be some more valuable discoveries made. The prospects for Plumas in quartz mining never were more flattering than at present. The owners of claims are developing them with their own labor and are not sitting around waiting for outside capital, as a great many of them have been doing in years past. Plumas is fast coming to be the great quartz mining county and more prosperous times are coming.

ROUND VALLEY CONSOLIDATED.—At the time this series of properties was incorporated, it was concluded to extend one of the tunnels with the expectation of reaching another ledge. Work was immediately begun. John Schinner secured the contract and prosecuted the work steadily until last week, when the ledge was reached after running the tunnel about 350 feet from the place of commencement, making the entire length about 500 feet. As the contract was to reach the vein merely the ledge has not yet been crossed. The ore prospects well, and it is claimed that it will pay a good milling profit.

PREMIER MINE.—Greenville Bulletin, Feb. 24: From E. W. Young, who is in company with Jas. Young owns the Premier, we learn that the 3-e-stamp mill is now in operation. Ore is being extracted from the mine, and crushing will be continued as long as there is a supply of water sufficient to enable them to do so. As there have been no changes yet, it is not known what the ore will pay, but the indications are that good results will be obtained.

Shasta.

BULLYHOOP.—Shasta Co. Echo, Feb. 25: Everything up here denotes lively times this coming spring and summer. Mr. A. C. Tins started up the Mammoth yesterday with a large force and is enlarging his force on the Central. Mr. J. E. Hearn, came up Sunday and intends to push the Pomeroy Case ahead. He is also opening up the Dollar Valley. The Cumberland Mining Co. has had from ten to twelve men here all winter working on the road, in the mine and on the mill. The millhouse is up and covered. The house is

2x34, with four floors. The lower or concentrating floor is 20x24; the battery floor rises eight feet and is 12x24; then the self-feeder and ore bin, eight feet rise, is 10x24; then a rise of twelve feet is the rock-breaker and ore house, that receives the rock as it comes from the mine. Mr. Finch tells me he expects the machinery up within ten days. The Cumberland, Mammoth, Central and Pound Cake mines are waiting for lumber.

FRENCH GULCH.—Cor. Free Press, Mar. 2: In the Deadwood district McDonald & Franck are running full steam on good ore. Watts & Martin are repairing their mill and will start up again in a few days with lots of ore on hand. John Gibson is hauling his ore down to his arastra and expects a big clean up. The Van Meter Bros. are taking out very rich rock, and have many thousands in sight. Westlake & Co. are taking out good rock. Ballou & Co. have a four foot vein of good ore. On the French Gulch side we have the Niagara mill running on full time with big returns. The Washington Co. are taking out very rich rock. The Scorpion Co. have a four or five foot vein of rich ore, as also the Empire mine close by. Jerry Madden and John Murry have struck a good pocket on Dutch gulch; quite a lot of locations made there.

Trinity.

NEW RIVER NOTES.—Humboldt Standard, Feb. 25: John W. Hitchens and his brother, A. Hitchens, left New River last Wednesday, and arrived here Monday, having sold out their interest in the Grover Cleveland mine. There are about seventy men, they say, about New River City and White Rock. They have this to say of times in that country: The Grover Cleveland mine is doing finely and the Hard Tack at a recent cleanup from nine tons of ore obtained \$1,500. The G. C. Armstrong mine, No. 2, is now grinding in the Hardtack arastra. The Hardtack talks of starting up at an early day. Chas. Huff is digging a tunnel in the Uncle Sam mine to a rich ledge. Major Thomas and James Sinclair are taking rock from the Hunter mine to Sarvis's arastra to grind—it is very rich too. Last Wednesday a week ago Mr. Sley struck a very rich ledge on Slide creek below the Toughnut mine. Board at New River City and White Rock is one dollar a day and single meals fifty cents. The winter has been quite mild. About three feet of snow fell in January at New River City, but the rain that succeeded it washed it away. There is no snow at New River City but probably eighteen inches at the Mary Elaine mine. It is understood that J. S. Thomson calculated to run from Scott's Valley this summer a pack train of forty mules. The weather has been bright and warm at New River lately, and the roads coming were very good, except for a space of two or three miles. Coming down Trinity river they saw the placer miners at work and had encouraging reports from them. They have been taking out several "five and ten dollar pieces." Frank Russell on Trinity river is running a giant at his claim and expects a good cleanup.

Tuloume.

ORE.—Tuloume Independent, Feb. 27: A new shoot of ore has been found in the Keltz mine, which promises to surpass anything known in that locality before. Mr. A. P. Johnson has struck it rich in the sell mine. Judging from the size of the vein, he is liable to have a bonanza.

NEVADA.

Washoe District.

CUMSTOCK.—Virginia Enterprise, Feb. 27: HALE AND NUR. The sinking of the deep water below the 3000 level has been discontinued for the present, and a spooling station is being opened at the 2500 level. The sinking was continued 20 feet below this level or station for a drainage sump. After the station is completed a drift shaft will be started to connect with the Combination shaft when it shall have been sunk to the 2500 level. A force of miners are kept steadily at work in the upraise to the 2500 level from the head of the water on the 3000, in the good body of ore demonstrated to exist at that point. This upraise has reached about half way up to the 2500, and the ore taken out in prospecting this work is carefully stored in the drift on the 3000 level such time as it can be advantageously hoisted to the surface for milling.

CHILLAR.Nothing doing this mine except as connected with the south lateral drift on the 3000 level into the Potosi ground. This work is being very actively promoted. No orders are yet received to resume sinking the Combination shaft but such orders are daily expected. The sooner the water for the benefit of all concerned, for that objective point, the 2500 level, on or to be attained at speed, as practicable in order to connect with the Hale and Nurona deep water and give opportunity for explorations downward in Savage and Gould and Curry.

COS. CALIFORNIA AND VIRGINIA.—The total daily yield of this mine is about 100 tons principally from the slopes and breasts of the 1700 level and between 1000 and 1500. Of this amount 140 tons are taken from the upper portion of the mine above the 1500 level. The general average of the ore at the mine is about \$15 per ton. The drift southwest on the 1500 level is making good, steady advancement at favorable working ground the same may be said of the drift being run to the southwest on the 1400 level.

OPHIR.On the 300 level, the main drift or crosscut west from the old Mammoth shaft is now in 100 feet. On the 200 level a west crosscut No. 4 from the main north lateral drift is now in 50 feet, the face showing favorable vein matter with streaks and branches of low grade ore. On the 700 level the joint Mexican and Union drift being run to the crosscut through Ophir ground is now at 365 feet 47 feet having been added during the work. No ore features of interest to report.

POTISI.—The south lateral drift from the Chollar on the 3000 level is now being actively advanced in this ground, following along the footwall or west side of the ore vein where the ground works most advantageously. This mine now has to some extent the other main mine north of it in the matter of joint crosscut. The drift is to be carried through the extent of the mine 750 feet to the bull north line unless something unforeseen should occur to prevent.

GOULD AND HART.—The reopening of the old ore levels of this mine, above the 1500 level, has been com-

menced under the management of James G. Rule who assures the company that he can find a body of paying ore. He is starting in on the 600 level, and has about 20 men employed repairing the timbering and preparing for ore extraction.

CROWN POINT AND BELCHER.—Daily yield about 350 tons, principally from the old upper workings, with a considerable contribution, however, from the 1700 and 1800 levels. The best ore extracted comes from between those levels, and exploration on the 1750 level show the ore to continue downward into the submerged depths below.

BENT AND BELCHER.—The water in the Osbiston shaft, which belongs jointly to this and the Gould and Curry company has been lowered to about the 2100 level, and a few feet further will allow connection with the third line of pumps, after which the water will be lowered with greater facility.

KENTUCK.—Superintendent Dovey is actively carrying on the work of extracting low grade ore, at the rate of 75 tons per day, all of which comes from above the 1300 level. Exploration work also goes ahead with a view to future developments.

YELLOW JACKET.—About 135 tons per day is the average yield, keeping the Brunswick mill steadily supplied. The old ore breasts from the 1300 level up hold out well, showing an affluence of low grade ore.

SIERRA NEVADA.—On the 500 level 65 feet was added to the main north lateral drift, making a total length of 1884 feet. Material continues to be hard, dry porphyry.

ALTA.—On the 700 foot level the main lateral drift north toward the Benton ground continues advancing at a good rate of progress in favorable ground.

UNION CONSOLIDATED.—On the 500 level north lateral drift, No. 2 from the east crosscut is in 180 feet. Material, principally vein porphyry.

OVERMAN.—About 50 tons per day of low-grade ore are being extracted from the old upper workings and shipped to the mill.

MEXICAN.—The explorations on the 500 level show no new features worthy of mention since last week's regular report.

Columbus District.

A PERFECT DAM.—Grass Valley Union, March 3: A visit to the Golden Gate gravel mine, at Sucker Flat was made by a representative of the Union some days ago, and it showed that that company was doing everything possible to restrain the tailing from the mine. The dam, a substantial structure, is built in the bed or worked out portion of the claim, and is so arranged that not a particle of water even can get through, and is not allowed to run over the dam. The material being worked is dumped into the upper portion of the dam, while the water is allowed to flow down to the lower portion, and there comes to a standstill, and has to raise three or four feet before it can flow into the tunnel. When the water has raised to that height it flows gently over the top of a water-tight box and falls into the tunnel below in a much clearer state than when it enters the claim. Even the finest particles of sand are restrained and no unjudicious man, who takes a look at the singular contrivance, can truthfully say that any of the debris can possibly escape into the river. Besides this, there are several small impounding dams constructed in the tunnel, which would serve to catch the tailings in case of any accident to the main dam. The company are now working on a small scale, but are complying with the law in every particular, and intend to do so for all time to come. Any suit against that company at present would be merely persecution—nothing else.

THE MILL.—Cor. Inyo Register, Feb. 25: The new mill built at this place for the Candelaria W. M. & Co., although completed and ready for service on the 15th instant, was not started until the 21st instant at 2:30 P. M., owing to the lack of water. The pipes, which have been frozen for the past six weeks, were finally thawed out, and the clear and sparkling waters of the White mountains run again freely. Everything about the mill is of modern and improved style, rotary dryer, two White & Howell rotary furnaces, etc. The stamps weigh 950 lbs. each, and the mammoth Harris-Corliss engine, of 500 horse-power, seemed to know the duty it had to perform, starting without a tremor and proving worthy of its name. The mill will have a crushing capacity of fully eighty tons a day, and at this writing everything is running smoothly. The mill was constructed by J. B. White & Co. in the remarkably short time of seventy-five days, and is a model in every respect, there being ample room and all labor-saving facilities.

HOLMES.—Candelaria True fissure, Feb. 27: We are working in the McCuen ledge near the old 7th level, where we have a streak of good ore. The stope 60 feet below the Morris drift looks just the same. It is larger and strong and produces well. In the 8th level we are stopping the Morris ledge. This stope is 170 feet long and will average fully 4½ feet wide. The ore is good milling and all goes to the mill as it comes down. There are places in this stope that are very large. We will commence drifting west in this stope during the coming week. It looks like it will continue west for a long distance. The Creer is looking exceedingly well. The ore in the stope is very high grade. Several samples taken from this stope during the last week have given us \$500 per ton. This very rich ore comes from a streak in the stope that is about two feet wide.

MOUNT DIABLO.—The raise from the west drift on the 4th level is up 60 feet, and it shows 5½ inches of \$60 ore. We are stopping some \$100 ore from the west drift on the 3d level. The bunch of ore above the east drift on the 2d level looks well and is turning out considerable \$200 ore. The raise from the intermediate between the 1st and 2d levels does not look quite so well. The face shows about a foot of \$70 ore.

Eureka District.

ORE SHIPPED.—Eureka Sentinel, Feb. 27: What might be termed the "small" mines of the district have produced well the past week, when we consider the fact that this is the season of the year generally devoted to "dead" work. Notwithstanding the Ruby and Dunderberg Company have a number of men opening out new drifts in the Lord Byron and Home Ticket mines, they shipped from the Dunderberg to the Eureka Con. works the past week 40 tons of ore. The Jackson mine on Ruby Hill continues to render a good account of itself. During

the week tributaries in the property shipped to the same reduction works a fraction over a hundred tons of good ore. From the King Lear mine on Adams Hill there were shipped to the Richmond furnaces 42 tons of ore. To the same works the Bowman shipped 14 tons, the May 7 and the Frazier and Molino 8. The Prospect Mountain properties fell behind a little during the week, but nevertheless three of them have been heard from—namely, the Eureka Star, from which 2 tons were shipped to the Richmond works; the Republic 4 tons, and the Senator Beck 4 tons. From the C. O. D. mine, near Hamilton, 3 tons of ore were sent to the same furnaces for reduction.

Globe District.

BONDED.—Belmont Courier, Feb. 24: James D. Sullivan has bonded to John H. Bolles, president of the Excelsior Water and Mining Company, of California, the mining claim situated in Globe mining district, Nye county, Nevada, known as the Bullion lode or claim; consideration \$50,000. Mr. Bolles agrees to cause a shaft 100 feet in depth to be sunk on the footwall, and to cross therefrom to the hanging wall of said ledge immediately.

Jackson District.

FLOURISHING.—Silver State, Feb. 29: Late reports from Jackson district are to the effect that the camp is flourishing. The new mill is expected to start up in a week or ten days, on ore from the Pennsylvania mine, of which there is an unlimited quantity in sight in the stopes and piled on the dump. William Woolcock has resigned the position of foreman of the Pennsylvania mine and gone north with John Catlow, and Philip Skewes, an old Unionville miner, has been appointed in his place.

Jefferson District.

ORE.—Belmont Courier, Feb. 24: E. Frank Corlillo, of Jefferson, informs us that some very nice looking ore is being taken out by the chlorides. The Harrison Bros. are taking out good ore, which they will run through their little mill as soon as the weather gets warmer.

Ophir District.

IMPROVING.—Belmont Courier, Feb. 24: Postmaster Thomas Warburton, who returned from Ophir on Tuesday, is more than pleased with the outlook for that camp. The lower level of the Twin River Company's mine continues to improve as work progresses. Other mines will undoubtedly be opened there as soon as the weather permits.

Union District.

TO SINK.—Belmont Courier, Feb. 24: It is the intention of the purchasers of the Centras mines, Union district, to commence work on them by sinking the main inclines to water and crosscutting the ledges to determine in some degree their extent. The veins in these mines are all strong and spotted with mineral wherever cut into: should they continue to water permanent mines will be added to the bullion producers of the country.

ARIZONA.

CHERRY DISTRICT.—Prescott Courier, Feb. 24: Wm. M. Munds, J. H. Hardy and others are doing good work in Cherry district, which is about 30 miles east of Prescott and not far from Verde river and valley. The Etta mine is opened by an 80-foot shaft. It is a strong 4 feet vein. Rock from it has paid \$75 a ton in an assay. The Supply, Nazareth and Crosscut mines are pretty well prospected by shafts and tunnels. Messrs. Munds & Hardy have just purchased a steam engine from J. W. Dougherty, with which they propose running two 12-foot arastras, in which they expect to be able to crush from three to four tons of rock every 24 hours. Good roads connect this promising district with Verde and Prescott. The recent strike of very rich silver-bearing rock in the Yusembia mine was, we hear, rather unexpected. The mine, it was thought by some, was worked out, but the Italian lessees have proven the falsity of this belief. A week or more ago, they had 10 tons of \$1,000 ore and twice that many tons of less valuable ore. Gentlemen who have just returned from Hassayampa district are highly pleased with ledges belonging to Messrs. Bigelow & Smith, Dave Grubb and others. They are, they say, excellent properties, and should not be permitted to remain their wealth of gold and silver. They are not to exceed 12 miles from Prescott, in a country wherein timber and water are plentiful. We learn that Mr. Cartmell's lease of the Atzlun mill expires in June next when he proposes removing such of the machinery as belongs to him to a neighboring mill site, which he has secured, and there erect a mill of larger capacity. There yet remain about 100 tons of the old Peck tailings to be treated. Those already put through have paid well. The stamps are now running on Happy Jack ore.

COLORADO.

THE DENVER ORE MARKET.—Tribune-Republican, Feb. 25: The steady receipts of ore at this market from all parts of the State and surrounding mining regions demonstrate that Denver is growing more popular daily as the great ore market of this country. This winter has proved the most favorable ever known for the movement of ore by the numerous railway lines converging here. The various reduction works and the public samplers are receiving ore in quantities exceeding that of any previous period, and mine owners are well satisfied with prices and the courteous treatment accorded them. Pueblo receives a large amount of ore that is sampled and exposed for sale by the public sampling works of Denver. The Western States and Territories are rapidly becoming convinced that this is the best market for their ores because they receive prompt payment, and there is no glut in the demand for all kinds of ores that are valuable in either gold, silver, copper and lead, or combinations of these metals. No valuable ores are declined because associated with base metals and working charges for such are surprisingly low in contrast with outside and limited markets. Several large mines from the far West are delivering their entire product to one of Denver's reduction establishments, and yet the owners have never visited this city or are they personally acquainted with the proprietors of the works where the ore is treated. The business was begun by correspondence and is maintained through satisfactory returns. Such mine owners are well posted on the cost of reduction, know the inherent value of their ore and what net cash should be deposited to their account. Finding that this can

be obtained through correspondence they have felt no necessity for sending anything but their mineral to Denver and are perfectly satisfied. Other owners consign their product to the public samplers of this city with like satisfactory results. The old time squabbles over ore settlements are of the rarest occurrence now-a-days, but smelters and samplers are always glad to meet owners of ores and show them how they conduct their business.

IDAHO.

THE SILVER FORTUNE.—Ketchum Argonaut, Feb. 24: This mine, situated on the East Fork of Wood River, at the time work was suspended last fall gave the most positive assurance of a large and rich body of ore, so much so that work will be resumed as soon as spring opens, and prosecuted with increased energy. The mine is owned by Jack Reed of Bullion, Shainwald of San Francisco and Roberts of Utah, all men of means. The mine is situated in a good locality. A Chicago company and the Philadelphia company own adjoining properties. Its accessibility is much in its favor. Within the boundaries of the claim is an abundance of wood and mining timbers. The work thus far has been of the practical kind. At the bottom of a fifty-foot shaft the vein is sixteen feet between walls. A tunnel of 275 feet will by survey cut the vein in fifty feet more. The ore is of low grade, but the quantity makes up for the deficiency. Assays uniformly show sixty per cent lead, and upwards of forty ounces in silver. It is the largest body of ore on Wood River, and is easily worked. About fifty tons of ore is on the dump ready for shipment. On the whole, the Fortune bids fair to be a real fortune for its owners.

BANNER.—Idaho World, Feb. 23: The richest ore ever taken from any silver mine is now being taken from the 400 ft. level of the Banner mine east of the shaft. The Silver Chief shaft is down 175 feet, and the boys are driving a drift west on the vein, which is of fair size, but of low grade ore, similar to the Banner at the same depth. A new ledge has been located in Archie gulch, and bearing the good name of Senator Beck. The owners are James Irwin, of Payette notoriety, and James Monroe, of the Silver Chief mine. The ledge is the same one struck by James White in his tunnel to tap the Monarch. The Senator Beck is a well-defined fissure vein, and assays over \$100 per ton. The lucky owners are very much elated over their good find. James Irwin is going to open the best mining camp in America by the first of May, or as soon as his tunnel reaches the ore body in the Monarch lode. The Banner mine has out near four hundred tons of rich ore. Snow is but three feet deep in this section, but very solid, there having been so much rain.

LUCKY BAR.—Wood River Times, Feb. 24: Last Saturday afternoon, a meeting of the placer miners owning claims between Glenn's Ferry and Salmon Falls was held near the Ferry, for the purpose of organizing a new district. George W. Faylor was elected chairman, J. K. Lovelace secretary and F. K. Stamper recorder. The recorder of Cassia county was requested to appoint Mr. Stamper his district deputy. The new district is situated wholly in Owyhee county. It is bounded on the north by the Snake river and the Alturas county line; on the west by the Bruneau river, and on the east by the Cassia county line. "Lucky Bar" was adopted as the name of the new district.

MONTANA.

BUTTE.—Inter-Mountain, Feb. 24: The supply of silver ore at the mills is more plentiful at present than it has been for the last two months. At the Moalton mill they have been obliged to refuse ore, as they had more than they could run immediately. The Lexington mill is fully supplied, as is also the Silver Bow and the Dexter. The latter is running on ore from the Anaconda dumps, since the North Star has been shut down. At the smelters there are no changes to record, with the exception of the Montana Copper company they are all running. When this will resume work is not yet known, but they continue to run their pumps at the mine and are doing some prospecting work in the lower levels. At the Moulton the two, three, and four hundred foot levels are being worked. The best ore at present is found in the north vein at a depth of three hundred feet. The south vein is producing good ore but not as much as the north one. The pump at the 700-foot station will soon be ready for work. The main shaft at the Lexington is now 920 feet deep and will be sunk to the 1000-foot station in about two weeks. When that depth is reached cross-cuts will be run to the vein. In other parts of the mine there are no changes to record. At the Minnie Irvine we saw to-day as fine ore being hoisted as any we have seen in the camp. It came from the stopes over the 150-foot levels, and was spotted with chlorides and brittle-silver. An average sample from that part of the mine assayed 194 ounces in silver and \$38 in gold per ton. A winze is being sunk from the 150-foot level; it is now 40 feet deep, and the level is also being driven east. The mine is producing five tons of ore per day. The Amy and Silversmith have their new pump in place at a depth of 200 feet and are crosscutting. They are also putting up a new boiler which will be ready for use by the 1st of March. The lessees of the Golden Rule yesterday bonded the Lamonta lode adjoining, and have begun work upon it from the Golden Rule shaft at a depth of about 200 feet. At the Union Consolidated mines at shaft No. 1 (on the Goldsmith No. 2) at 200 feet deep they are drifting and stopping. At the Bachelor lode—shaft No. 2—they are sinking below the 200 foot level. At the Belcher lode—shaft No. 4—the shaft is 170 feet deep, and there they have just met water. The pump was started yesterday. At the Silversmith, Ellis & Co., lessees, have started a new shaft about seventy-five feet east of the main one. At present they are only twenty-five feet deep and are sinking an incline shaft on the vein. The new shaft on the Star of the West is 100 feet deep and is to be sunk to a depth of 400 feet. At the old shaft the pump is working, and some work will be done there in the old levels after the water is raised. Williams & Co. have recently leased the Del Monte lode owned by Mr. A. J. Davis. This is thought to be on the same vein as the famous Lexington. The shaft is seventy-five feet deep, from which they are at present drifting. The Pacific mine keeps the Old Lexington mill supplied with sixteen tons of ore daily from which they are turning out very good bullion. On the 23rd they shipped three bars weighing 297½ pounds. At the Lloyd and

Harris tunnel they are sinking on the Pennsylvania lode.

PHILLIPS RE.—Cor. New Northwest: The Granite will eventually demote the silver currency of the world—ships \$125,000 monthly product of a 20-stamp mill, and could ship a million without any trouble if the batteries worked on assorted ore. The ore chute in tunnel No. 5 is over one thousand feet in length, and placing a conservative estimate on the value of the mineral in sight, it will exceed fifteen millions of dollars. Everything about this great property shows system and order, and if any money is wasted on ornamentation or frivolity, "yours truly" has failed to perceive it.

THE HOPE.—Levels are now being driven from the shaft to intersect the vein on its dip. When these are completed stoping will commence, and the now idle mill will again drop its ponderous stamps. It is a commendable feature of the company's management of this property that they never give up when ore gives out. Byron Balard, who has had charge of the mine more years than I can remember, and who is undoubtedly better posted on its eccentricities than any other living man, and Supt. Geo. H. Babcock, deserve personal commendation for the valuable services they have rendered the company and district alike.

SAN FRANCISCO CONSOLIDATED.—Patten & Co. are driving the tunnel header steadily east. The vein is strong and carries a seam of gold ore on the hanging wall side. Indications are favorable for a body of high-grade pay rock within the next fifty feet.

OREGON.

GOLD HILL.—Grant's Pass Courier, Feb. 24: Among the discoveries on this hill is that of Morrison & Co., on the northeast. These gentlemen are starting a tunnel on their claim known as the "Buckeye." We like the prospect very well, and believe it is the intention of the company to do considerable work. It will probably develop into a good property. The Black Republican, of which one location has been made by Scranton & Ray, looks as though it might develop into something good. Marion Taylor owns the extension on this ledge and has done work sufficient to disclose a well defined vein—the only one we saw on the hill—which is from 12 to 15 inches thick, with well defined walls, which indeed gives it a look of a genuine mine. Mr. J. W. Scranton also has a cross-lead running northwest and southeast on the S. E. extension of this ledge. Douden & Co., a short distance to the southeast from Ray & O'Donnell, have made a rich discovery from which they have taken out some \$300.00. We examined the formation and find it very similar to that of the "Struck it at Last." Mr. Scranton's prospects—of which he has a number—are all in this immediate vicinity, and no doubt he will yet be one of the lucky ones. Fisher & Stewart have a rich discovery, about one mile from the old Gold Hill discovery, but as we did not see it or any of the rock from it, we are unable to say anything definite concerning its lustrous prospects. One mile from the "Struck it at Last," and to the northwest, is the famous Iron mine, the product of which yields 90 per cent magnetic iron. This iron is being used in Portland in the manufacture of Bessemer steel, and no doubt will be worked sometime very extensively. Magruder Bros. & Hayes are tearing the ground away at a lively rate with a giant in one of the gulches immediately below the discovery made by Ray & O'Donnell. As quartz is the mother of gold, and as it certainly exists above, these gentlemen will certainly catch their share this season. The Magruder & Hayes have a splendid digging; the water supply is abundant, coming out of Sam's creek, and they will probably run until June or July.

THE BLACKWELL DISTRICT.—About three miles southeast of Gold Hill—we mean the town—is what is known as the Blackwell district, which is now receiving attention both as to placer and quartz mining. It is in this vicinity that W. H. Swinden has recently made some startling developments. From Mr. John Swinden we learn that they were working their placer when they found the float which led to their rich quartz discovery. The rock shown us was fully as rich as that of the old Gold Hill "pocket." Mr. W. H. Swinden claims the discovery is no "pocket" but a genuine ledge. The Iowa, Illinois and Little Galena discoveries are also in the Blackwell district. Both gold and silver is found there and all the claims are showing up well for the amount of work done. D. B. Martin on Kane's creek, 2½ miles from Gold Hill is working a placer with the best of prospects. He is taking out a very fine character of gold, has plenty of water, and deserves prosperity. Oliver Boyd and other Woodville parties are also interested in the Blackwell district and are well pleased with their prospects. Mr. Boyd showed us a very nice specimen of galena from one of the claims they are working. There are many other claims over there worthy attention, but as our time was limited we did not get to see them. The one thing needful is a mill at some point near Gold Hill for the treatment of the ores now being discovered. The investment of capital in this direction would no doubt be a good thing for those investing in it, as there will undoubtedly be a great deal of paying quartz taken out this year. The advantages of a mill there are plainly visible, from the fact that there is a splendid water power, and lots of fuel, etc., which is largely in favor of such an institution.

UTAH.

PARK NOTES.—Park Record, Feb. 27: The Ontario will pay its usual monthly dividend of 50 cents per share to-day, aggregating \$75,000. Total of dividends this year \$150,000. An indirect report comes to us of a rich strike in the George Henry, a new property lately opened by Wm. Crockett, at the head of Dutch Canyon. Several miners have been laid off at the Daly mine for a couple of weeks on account of the teams not being able to haul ore, owing to the bad condition of the roads. Work on the Deer valley tunnel, owned by Messrs. Barry, Sharp, Gregg and others, is progressing rapidly. The tunnel is now in a distance of 150 feet. The Crescent concentrator has been undergoing a radical change lately. Its capacity has been doubled, the old machinery repaired or replaced by new, and everything possible done that will tend to demolish the monster ore dump at the mine with the first opening of spring.



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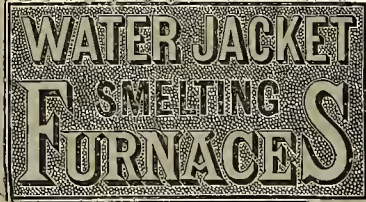
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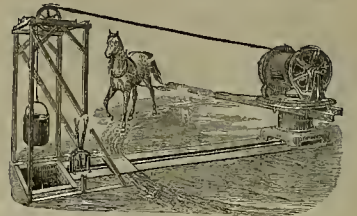
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For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



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Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



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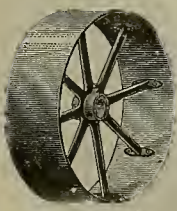
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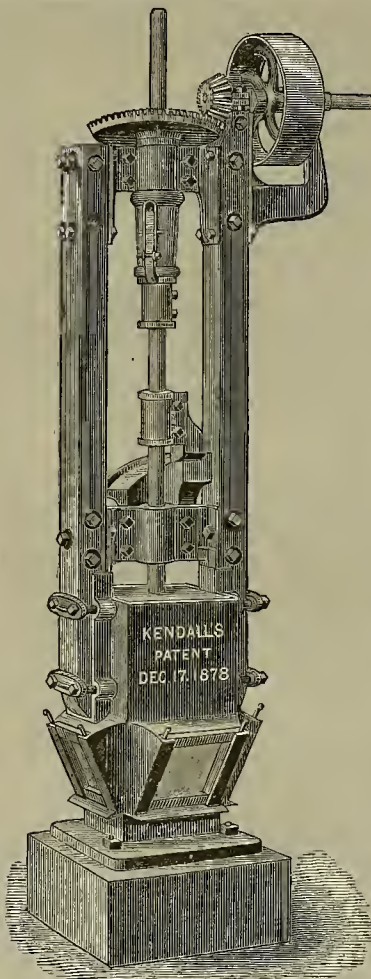
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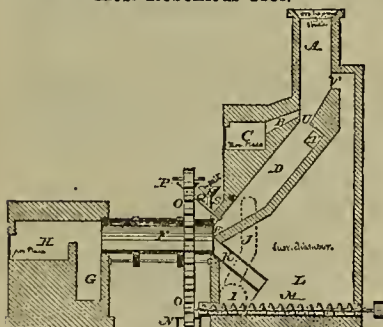
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A Continuous Furnace for Working the
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For full description of this furnace see MINING AND SCIENTIFIC PRESS of Jan. 30, 1886, or address the inventor for circular.

The main features of the furnace are as follows: The self-discharging dust-chamber and automatic return to the cylinder when not sufficiently chloridized. A saving of a large percentage of salt. Saving in weight of cylinder, which is short, as the greater part of the sulphur is eliminated in the stack. There is less volatilization by desulphurizing without salt. A higher percentage of chlorination can be obtained by first desulphurizing, as shown in the report of the Navajo mine, at Tuscon, Nev. The separate fires give opportunity for perfect control of heat, making it easy to roast the most rebellious ores. By the constant motion of the pulp while being desulphurized, there is no danger of matting. The combination of flues and dust-chamber makes the construction comparatively cheap.

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Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).
Orders Promptly Executed



Mining Share Market.

Matters in the mining share market continue quiet. On the Comstock the main lateral drift south from the Chollar mine, on the 3100 level, is getting well advanced into the Potosi ground, and as it progresses southward toward the Bullion ground, it becomes more and more an objective point of interest in the development of the mines to the southward. In case this south lateral drift from the Chollar does succeed in running through to the Bullion, it is a plain proposition for the Bullion company to sink their Ward shaft down to that level, and connect with the drift in question.

This drift, through connection with the Ward shaft, giving good ventilation, etc., could be advantageously carried forward through the Eschequer and Alpha ground to the connection with the Yellow Jacket new shaft, which it would strike near the bottom, 3000 feet below the surface. The connection with the rest of the Gold Hill group is already made or easily can be; therefore, the importance of this drifting to the southward is not difficult to comprehend. Moreover, if the Yellow Jacket and other mines assist in the pumping, the lode can be easily drained, as the Combination pumps are doing that now. None but Cornish pumps, same as that in the Osiston shaft, could be used, as the present water motive supply is inadequate to run any more hydraulic pumps than the one in the Combination shaft.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco:

SAN JOSE AND ALMADEN R. R. Co. Feb. 27.—Object, constructing and operating a broad gauge railroad in the county of Santa Clara, commencing at a point on the line of the northern division of the Southern Pacific railroad, one-quarter of a mile south of Oak Hill station, and running thence to the junction of the Guadalupe and Los Alamitos creeks; thence up and along Los Alamitos creek to New Almaden, eight and a half miles in length. Capital stock, \$100,000, in 1000 shares. Directors, Charles F. Crocker, Ariel Lathrop, M. F. Smith, A. C. Bassett and J. L. Willcutt.

GUARDIAN PRINTING AND PUBLISHING Co. Mar. 2.—Object, to publish newspaper periodicals. Capital stock \$10,000. Directors, R. W. Pearson, S. A. Pearson, A. G. Pearson, J. McKee and J. Q. Adams.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Hanauer, Feb. 28, \$6680; Germania, 25, \$3964; Sprucemont, 24, \$2500; Germania, 24, \$11,800; Hanauer, 24, \$3430; Kent, 26, \$1280; Hanauer, 26, \$3440; Alice, 26, \$15,267; Germania, 26, \$2682; Kentuck, 27, \$11,350; Hanauer, 27, \$3450; Germania, 27, \$2604; 28, \$4754; Hanauer, 28, \$3500; Sprucemont, 28, \$3360.

PLATINUM.—Small quantities of platinum are found in most placer deposits, but miners have not taken much trouble to save it for want of a ready market. Those who have any on hand or save it in the future can, however, now readily dispose of the substance to H. M. Raynor, No. 25 Bond street, New York. Both native and scrap are purchased by him at his manufactory.

Testing and Working Silver Ores

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Fitchell's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroeckh's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tallies, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

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ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co.	Nevada.	23.	25.	Feb 16.	Mar 23.	Apr 12.	B. Burris.	309 Montgomery St
Alta S M Co.	Nevada.	33.	25.	Feb 11.	Mar 5.	Mar 25.	W. H. Watson.	302 Montgomery St
Bentou Con M Co	Nevada.	15.	10.	Feb 4.	Mar 11.	Mar 30.	W. H. Watson.	302 Montgomery St
East & Beecher M Co.	Nevada.	33.	59.	Jan 6.	Feb 10.	Mar 9.	W. Willis.	309 Montgomery St
Eschequer M Co.	California.	15.	25.	Feb 9.	Mar 17.	Apr 9.	T. J Sullivan.	121 Post St
Goa Pacific M Co.	California.	8.	15.	Feb 18.	Mar 22.	Apr 15.	F. E. Luty.	330 Pine St
Forty-nine M Co.	California.	1.	10.	Feb 4.	Mar 15.	Apr 5.	A. L Perkins.	310 Pine St
Gover Improvement Co.	California.	1.	50.	Feb 8.	Mar 25.	Apr 19.	E. N. Van Brunt.	318 Pine St
Johnson M Co.	California.	3.	12.	Feb 4.	Mar 3.	Apr 2.	G. W. Hie.	318 Montgomery St
Lady Washington Con M Co.	Nevada.	5.	05.	Feb 4.	Mar 9.	Mar 23.	W. H. Watson.	302 Montgomery St
Mexican M Co.	Nevada.	31.	25.	Feb 9.	Mar 15.	Apr 8.	C. E. Elliott.	309 Montgom ry St
North Belle Isle M Co.	Nevada.	10.	20.	Mar 2.	Apr 6.	Apr 23.	J. W. Pew.	310 Pine St
Nevado M Co.	Nevada.	14.	30.	Jan 9.	Feb 15.	Mar 8.	J. W. Pew.	310 Pine St
Potosi M Co.	Nevada.	24.	30.	Feb 4.	Mar 4.	Mar 26.	C. E. Elliott.	309 Mtgomery St
Peer M Co.	Arizona.	4.	10.	Jan 11.	Feb 15.	Mar 6.	A. Waterman.	309 Montgomery St
Union Con M Co.	Nevada.	32.	11.	Feb 15.	Mar 8.	J. M. Huntington.	309 California St	

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Anglo-Mexican M Co.	Mexico.	C. A. Moore.	217 Sansome St.	Annual.	Mar 9
Andes M Co.	Nevada.	Called by Stockholders.	309 Montgomery St.	Special.	Mar 10
Chollar M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	Annual.	Mar 17
Kentuck M Co.	Nevada.	J. W. Pew.	310 Pine St.	Special.	Mar 16
Johnson M Co.	Nevada.	T. J. Sullivan.	121 California St.	Annual.	Mar 16
Potosi M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	Annual.	Mar 1
Virginia Con M Co.	Nevada.	A. F. Bernard.	361 Howard St.	Annual.	Mar 1

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Caladonia M Co.	Nevada.	W. L. Oliver.	323 Montgomery St.	10.	Feb 23
San Virginia & California M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	30.	Feb 12
Debec Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Feb 9
Holmes M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Feb 21
Jackson M Co.	California.	D. G. Bates.	419 California St.	10.	Feb 17
Nanabutan S. M. Co.	Nevada.	John Crocker.	323 Montgomery St.	25.	Feb 15
Silver King M Co.	Arizona.	J. Nash.	323 Montgomery St.	25.	Feb 15
Syndicate M Co.	Nevada.	J. Stadler Jr.	419 California St.	10.	Dec 24

PACIFIC COAST WEATHER FOR THE WEEK.

[Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.]

	Portland.				Red Bluff.				Sacramento.				S. Francisco.				Los Angeles.				San Diego.			
DATE.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.
Feb. 24-Mar. 3	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.
Thursday .....	.00	43	S	Cy.	.00	62	SW	Cl.	.00	55	SW	Cy.	.00	55	S	Cy.	.00	67	NE	Cy.	.41	64	E	Th
Friday .....	.03	46	S	Cy.	.00	53	NW	Cl.	.00	55	NW	Cl.	.00	65	W	Cl.	.00	63	W	Cy.	.24	58	W	Th
Saturday .....	.08	48	NW	LR	.00	50	S	Cy.	.01	52	S	Cl.	.05	50	NW	Cy.	.06	58	W	Cy.	.41	56	W	Cy.
Sunday .....	.04	48	E	Cl.	.18	48	S	Cy.	.00	47	SE	Cy.	.18	47	S	Cy.	.38	47	NE	LR.	—	—	—	—
Monday .....	.00	48	E	Cl.	.00	50	N	Cy.	.32	47	NW	Cy.	.00	50	N	Cl.	1.53	51	NW	Cy.	—	53	W	Th.
Tuesday .....	.00	51	N	Cl.	.00	47	SE	Cy.	.00	51	SE	Cy.	.01	53	SE	Th.	.35	53	SE	Cy.	—	54	S	LR.
Wednesday .....	.00	51	NW	Cl.	.23	45	E	LR.	.22	53	SE	Cy.	.23	52	NW	Th.	.44	57	SW	Fr.	1.31	59	SW	Cl.
Totals .....	.15	—	—	—	.41	—	—	—	.55	—	—	—	.47	—	—	—	2.81	—	—	—	2.37	—	—	—

EXPLANATION.—Cl. for clear; Cy. cloudy; Fr. fair; Fy. foggy; — indicates too small to measure. Temperature Wind and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 11.	WEEK ENDING Feb. 15.	WEEK ENDING Feb. 25.	WEEK ENDING Mar. 4.				
Alpha.....	.35	.30	.25	.40	.35	.45		
Alta.....	.10	.15	.10	.10	.10	.15		
Andes.....	.15	.10	.15	.10	.15	.15		
Argenta.....	.05	.05	.05	.05	.05	.05		
Belcher.....	1.10	1.15	1.10	1.05	1.10	1.05		
Belding.....	.75	1.40	1.40	1.10	1.10	1.75		
Bentou.....	.25	.25	.35	.40	.50	.45	.50	
Bonanza King.....	.10	.10	.10	.10	.10	.10	.10	
Belle Isle.....	.10	.10	.10	.10	.10	.10	.10	
Bodie Con.....	1.35	1.67	1.10	1.45	1.70	1.55	1.75	
Bentou.....	.25	.25	.35	.40	.50	.45	.50	
Bodie Thump.....	.25	.25	.35	.40	.50	.45	.50	
Bulwer.....	.45	.45	.45	.60	.60	.60	.60	
California.....	2.30	2.70	2.05	2.45	2.25	2.40	2.25	2.40
Challenge.....	.15	.10	.15	.20	.25	.15	.20	.25
Champion.....	.35	1.00	.70	.85	.85	.91	1.00	1.25
Chollar.....	.95	.90	.95	1.25	1.40	1.10	1.40	1.40
Confidence.....	.20	2.70	2.05	2.45	2.25	2.40	2.25	2.40
Con. Imperial.....	.20	2.70	2.05	2.45	2.25	2.40	2.25	2.40
Con. Virginia.....	.20	2.70	2.05	2.45	2.25	2.40	2.25	2.40
Crown Point.....	.90	1.30	1.05	1.15	1.10	1.20	1.15	1.20
Day.....	.15	.15	.15	.15	.15	.15	.15	.15
Eureka Cou.....	1.95	2.20	1.25	1.85	1.85	2.70	1.90	2.00
Eureka.....	.10	.10	.10	.10	.10	.10	.10	.10
Eschequer.....	.10	.10	.10	.10	.10	.10	.10	.10
Grand Prize.....	.70	.90	.70	.75	.80	1.05	1.00	1.15
Gould & Curry.....	.25	.25	.25	.25	.25	.25	.25	.25
Goodshaw.....	.20	2.55	1.10	2.30	2.20	2.30	2.20	2.30
Hale & Norcross.....	.10	.10	.10	.10	.10	.10	.10	.10
Holmes.....	.11	.11	.11	.11	.11	.11	.11	.11
Independence.....	.10	.10	.10	.10	.10	.10	.10	.10
Julia.....	.10	.10	.10	.10	.10	.10	.10	.10
Justice.....	.10	.10	.10	.10	.10	.10	.10	.10
Marion White.....	.10	.10	.10	.10	.10	.10	.10	.10
Mono.....	3.70	3.95	3.00	3.90	3.80	4.20	3.80	4.30
Mexican.....	.25	.40	.25	.35	.30	.40	.45	.45
Mt. Diablo.....	3.00	2.75	3.50	3.00	3.00	3.50	3.50	3.50
Northern Belle.....	.05	.35	.35	.40	.35	.10	.40	.40
Nevada.....	.10	.10	.10	.10	.10	.10	.10	.10
North Belle Isle.....	.10	.10	.10	.10	.10	.10	.10	.10
Occidental.....	.10	.10	.10	.10	.10	.10	.10	.10
Opbri.....	.45	.60	.40	.50	.45	.50	.50	.60
German.....	.20	.15	.10	.20	.30	.30	.40	.40
Post Belcher.....	.20	.40	.21	.25	.25	.30	.30	.55
Pinal Con.....	1.05	1.15	1.10	1.20	1.15	1.50	1.30	1.45
Occidental.....	.10	.10	.10	.10	.10	.10	.10	.10
Seg. Belcher.....	.10	.10	.10	.10	.10	.10	.10	.10
Rega.....	.10	.10	.10	.10	.10	.10	.10	.10
Silver Hill.....	.10	.10	.10	.10	.10	.10	.10	.10
Silver King.....	.10	.10	.10	.10	.10	.10	.10	.10
Scorpion.....	.10	.10	.10	.10	.10	.10	.10	.10
Syndicate.....	.15	.15	.15	.15	.15	.15	.15	.15
Union Con.....	.25	.31	.50	.55	.50	.60	.50	.65
Uta.....	.60	.65	.60	.50	.75	.70	.75	.75
Yellow Jacket.....	.50	1.05	.95	1.00	.95	1.00	.95	1.05

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Mar. 4.	500	Hale & Norcross	2 10 @ 2.15
110 Alpha.....	35 @ 40	700 Mexican.....	1.50
50 Alta.....	35c	460 Mono.....	1.40
150 B. & Belcher.....	1.70	100 Opbir.....	.65c
50 Bodie Con.....	1.60	600 Potosi.....	.50c
100 Belcher.....	1.15	100 Feeless.....	.15
450 Chollar.....	1.20 @ 1.23	90 Silver King.....	.65
50 Crown Point.....	1.15	50 Silver Hill.....	.15
980 Con Va & Cal.....	2.40 @ 2.4	180 Savage.....	1.25 @ 1.30
10 Confidence.....	1.25	550 Sierra Nevada.....	.75 @ .80
250 Con. Pacific.....	.25	50 Union Con.....	.50
350 Gould & Curry.....	1.10	110 Yellow Jacket.....	1.00

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DELINQUENT NOTICE.

Pine Tree Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Summit Mining District, Kern County, California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 23d day of November, 1885, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	Shares.	Amount.
Bennet, C.	9	1,000	\$ 150.00
Grisswald, A. H.	10	1,000	150.00
Grisswald, A. H.	13	1,000	150.00
Grisswald, A. H.	11	1,000	150.00
Grisswald, A. H.	16	500	75.00
Grisswald, A. H.	65	500	75.00
Grisswald, A. H.	66	250	37.50
Grisswald, A. H.	67	250	37.50
Grisswald, Mrs. A. H.	8	1,000	150.00
Grisswald, Wm.	17	500	75.00
Grisswald, M.	18	500	75.00
Grisswald, Harriet B.	19	500	75.00
Wilson, W. C.	7	20,000	3,000.00
Wilson, W. C.	20	1,000	150.00
Wilson, W. C.	21	1,000	150.00
Wilson, W. C.	22	1,000	150.00
Wilson, W. C.	23	1,000	150.00
Wilson, W. C.	24	1,000	150.00
Wilson, W. C.	25	1,000	150.00
Wilson, W. C.	26	1,000	150.00
Wilson, W. C.	27	500	75.00
Wilson, W. C.	28	500	75.00
Wilson, W. C.	29	500	75.00
Wilson, W. C.	30	500	75.00
Wilson, W. C.	31	100	15.00
Wilson, W. C.	32	100	15.00
Wilson, W. C.	33	100	15.00
Wilson, W. C.	34	100	15.00
Wilson, W. C.	35	100	15.00
Wilson, W. C.	36	100	15.00
Wilson, W. C.	37	100	15.00
Wilson, W. C.	38	100	15.00
Wilson, W. C.	39	100	15.00
Wilson, W. C.	40	100	15.00

And in accordance with law, and an order of the Board of Directors, made on the 22nd day of December, 1885, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Company, room 4, No. 309 California street, San Francisco, California, on Monday, the 15th day of February, 1886, at the hour of 2 P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. M. BUFFINGTON, Sec'y.

OFFICE:—Room 4, No. 309 California St., San Francisco, California.

POSTPONEMENT.

At a meeting of the Directors, held on the 15th day of February, 1886, at one o'clock P. M., it was ordered that the day of sale be postponed to the second day of March, 1886, at the hour of two o'clock P. M. of that day, at the office of the Company, Room 4, 309 California Street, San Francisco, California.

J. M. BUFFINGTON, Secretary. San Francisco, Feb. 15, 1886.

DIVIDEND NOTICE.

OFFICE OF

The Paradise Valley Mining Company. San Francisco, California.

At a meeting of the Board of Directors of the above-named Company, held February 24th, Dividend No. 6, of Ten Cents (10c.) per share was declared, payable on SATURDAY, the 27th day of February, at the office of the Company. Transfer books will close on Thursday, February 25th, at 12 o'clock M.

W. LETTS OLIVER, Secretary.

OFFICE—No. 328 Montgomery St., San Francisco, Cal.

OFFICE OF THE

Caledonia Gold Mining Company San Francisco, California.

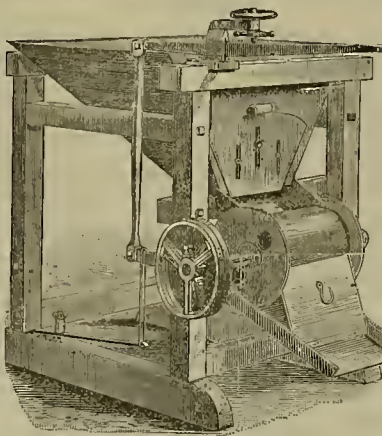
At a meeting of the Board of Directors of the above-named Company, held February 8, 1886, Dividend No. 4, of Ten Cents (10c.) per share, was declared, payable on Tuesday, the 23d day of February, 1886, at the office of the Company, and at Messrs. Laidlaw & Co., Transfer Agents, 14 Wall street, New York. Transfer books will close on Saturday, February 20, 1886, at 12 o'clock M.

W. LETTS OLIVER, Sec'y.

OFFICE—No. 328 Montgomery St., San Francisco, Cal.

THE ORIGINAL Roller Ore Feeder.

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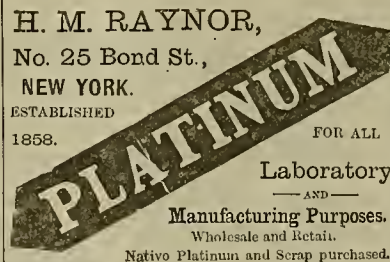


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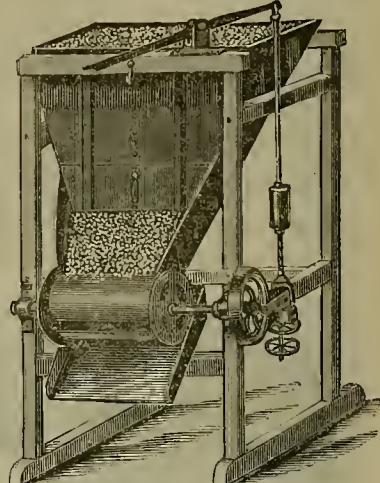


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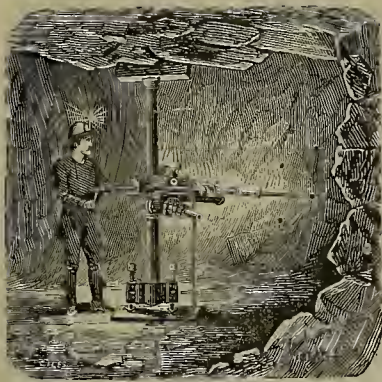
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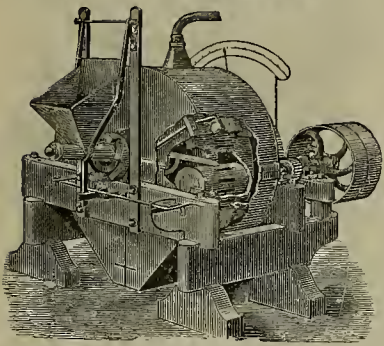
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[From the Engineering & Mining Journal, Aug. 8, 1885.]
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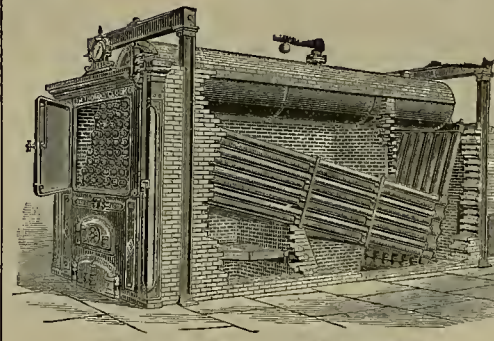
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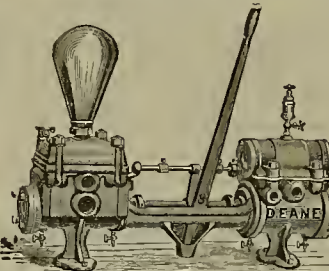
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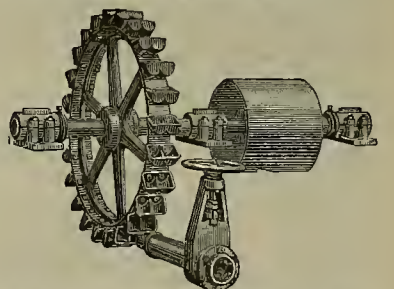
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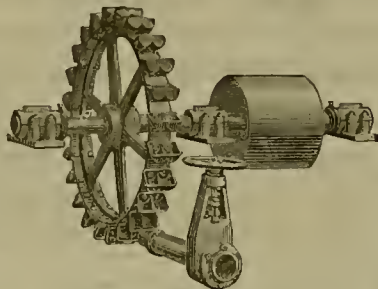
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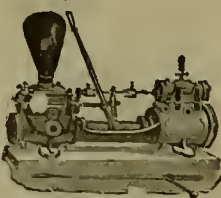
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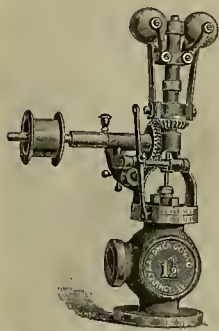
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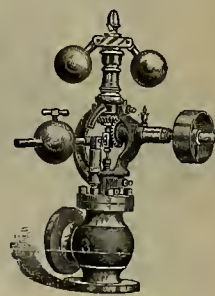
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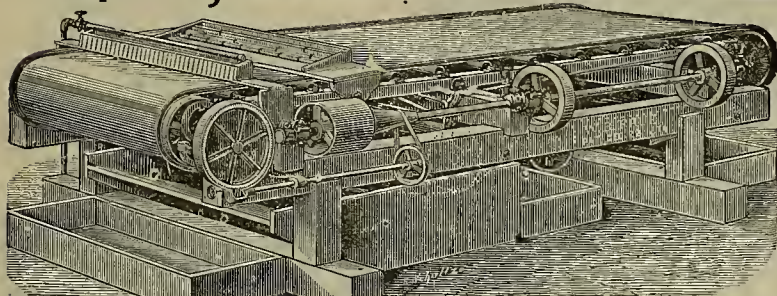
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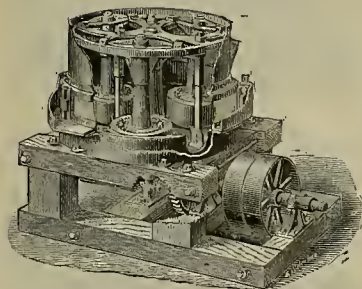
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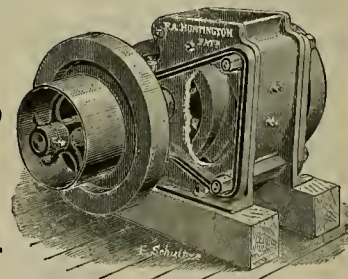
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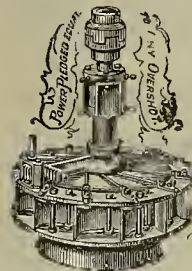
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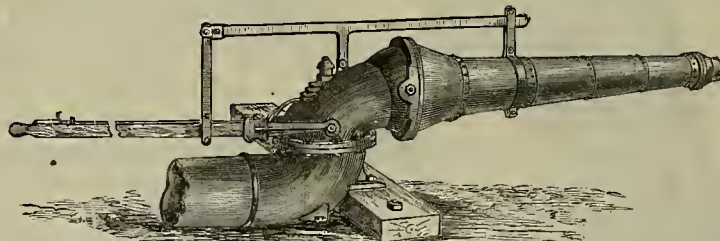
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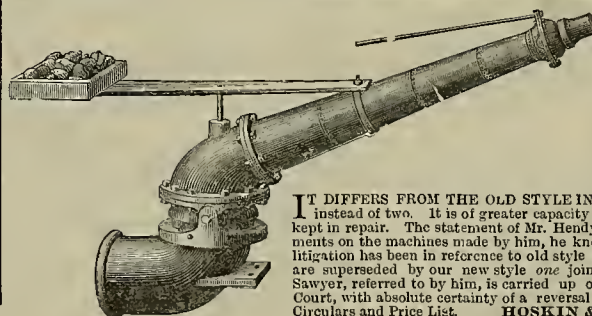
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, MARCH 13, 1886.

VOLUME IJI
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New Gold Fields.

Attention is just now being turned to gold fields both in the Argentine Republic, South America, and Honduras, Central America. The Patagonian El Dorado is a new one in a region inhospitable in every way, but reports from there speak of the gold fields as very extensive. The facts are furnished by E. L. Baker, Consul-General to the Argentine Republic. The points in his report were obtained from an investigation made by a commission appointed by the Argentine Republic. Among other things that report says: According to the opinion of the mining engineer who has examined the case, the auriferous layer extends along the coast all the way from Cape Virgins to the north of the Barrancas del Condor, a distance of forty miles, and it is possible that it may extend to Rio Janeiro. The engineer thinks that these gold deposits are of a superior class, and that there is abundance of both gold and platinum.

There has never been any considerable gold mining in this part of South America, and the natives have but the crudest notions of how to proceed in the work of taking out the gold. Great excitement, however, prevails, and the Chileans are already hard at work. One hundred of them from Sandy Point have been at work in a body. Mr. Baker says it is impossible now to estimate the extent or wealth of the washings, but they are thought to be as rich or richer than those of California and Australia. While giving all these facts Mr. Baker advises that no rush be made to these new mines until something more definite is known about them. It is very probable that considerable of a struggle will be the result of this find in regard to who shall mine. The Chileans are particularly aggressive, and will probably claim pretty much of everything. Chile lies between Patagonia and the ocean and extends along its whole border. The Chileans are pretty good miners and will very soon prove the value of the deposits.

Reports have also been received of new placer fields in Honduras, Central America. Some California prospectors sent there by an Indiana company to examine the fields, on sending back their reports, caused considerable excitement in Chicago, and a number of persons have gone to the mines. James Rector writes back that the discovery is a very important one. The new field lies in the eastern portion of the republic of Honduras and about 150 miles from the Atlantic Coast. The placers are in and adjacent to the headwaters of the Guayape river, which is one of the tributary streams of the Rio Patuca, a region long known for its mineral resources. Mr. Rector and party have explored the stream and its gravelly bottom for nearly fifty miles, and have found scores of places where the gravel yields from 10 to 80 cents to the pan. They have begun regular mining, however, in a place where, after much toil, they succeeded in turning the river from its bed. They are sluicing out from \$7 to \$10 a cubic yard. The bed of the river they have reclaimed covers many acres in extent, and under the laws of the republic they can lay claim to it all. The facilities for placer mining are unsurpassed. The gold which has been sent up was exhibited to a select few in Chicago. The Government of Honduras, it is said, is very liberal to miners, let them come from where they may. It required no citizenship to work mineral land, and there is a very large margin allowed as to extent of holding. Gold and silver mining has

long been an established industry in the region of the Rio Patuca, but the inertness of the people, the apparent remoteness of the country and the lack of adequate capital has prevented anything like systematic work. Mining men from the West who are at present in Chicago are watching with keen interest the Honduras developments. The country is described as healthful, entirely free from malaria, and the temperature in the foothills of the mountain ranges where the placers are to be found at from 45 degrees to 75 degrees the year round.

Of course, in both these cases the mines are represented to be richer than the old California mines, just as when men find new quartz fields they always say the veins are richer than the Comstock; but so far, in neither case, have developments been carried on sufficiently to prove more than the existence of gold in certain localities. Whether the area is large remains to be seen. At all events, both places are so

A Steam Washing Machine.

Just at this time there is considerable interest on the subject of washing clothes by machinery. The steam washing machine shown in the engraving is one built by J. B. Jardine, of the Atlas Iron Works, 213 and 215 Mission street, in this city. It is one of the latest designs in the line of laundry machinery, and has given satisfaction where used. To a person who has never seen a steam washing machine in operation, a short description will be of interest. It consists mainly of two large drums or cylinders, one inner and one under. The inner one is corrugated on the inside like an ordinary wash-board, and the staves are set about three-eighths of an inch apart, so that the water and steam are free to go all through the interstices and thoroughly agitate the clothes with fingers of steam. The outside one rests on the floor of the laundry room and the inner

enterprise of Mr. Jardine. His list includes all that is necessary for the equipment of a first-class steam laundry, and persons desiring to start in business will do well to call on him before sending East for such machinery. Those who are afflicted with a mania for sending East for such machinery will find just as good here, and at the same time help our home mechanics and industries. Many steam laundries are now being started so as to displace the Chinese on this coast, and the manufacture of steam washing machinery will, no doubt, be a more important industry in the future.

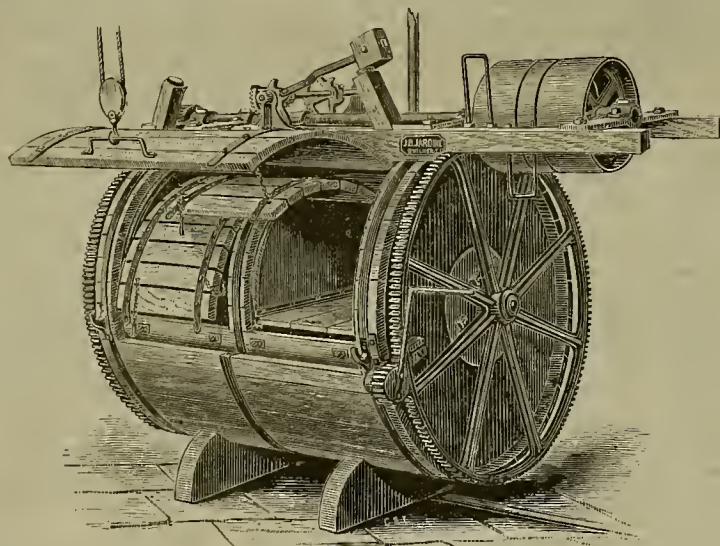
Preparing Rocks for Examination.

A short time since we made an extract from Hussack's "Determination of Rock-Forming Minerals," describing briefly the two methods of examining rocks—the macroscopical and microscopical. In the former method of examination, those parts of the mineral mixture discernible to the naked eye can be studied with reference to crystalline form, cleavage, color, luster, streak, hardness, etc.

This method is by far the easiest for miners to follow, since by it they can easily understand and distinguish the enclosing and wall rocks of the different lodes they are working—those rocks having so much to do with the productiveness of the lodes they are working. The rocks have to be roughly prepared, so that the outer surface, viewed as an opaque object, with only the aid of a common hand-magnifier, will give all the information ordinarily required by the miner, and in most cases he will find he will be able to distinguish the structure and composition of the commoner rocks, so that with the help of a collection of types, prepared after the same fashion, he can compare and identify those under examination.

An excellent plan for preparing rocks for determination in this way was devised some time since by Melville Attwood, of this city. By his method the rock for examination may be prepared as follows: First, wash the specimen clean, using a brush to get rid of any clay or dirt, then select the side or part you wish to examine, and grind it down on a piece of sandstone (a shoemaker's sharpening stone), until a perfectly flat surface is obtained. This will occupy but a very few minutes, unless the rock is very hard. The surface should be then worked down still finer with a square emery file, using water, and after you have obtained sufficient polish, wash the rock again, and then let it dry gradually, either on a stone, or what is better still, a little brass table, with a spirit lamp. When perfectly dry, heat it again to a point so that it can hardly be handled; then varnish the polished side, while hot, with a mixture of one part of Canada balsam to three parts of alcohol, which must be warmed before applying it, and laid on with a camel's-hair brush. It will soon dry, and if left for a day or two will harden, so that you can handle it without injury. The effect of this treatment is remarkable, as the parts of the rock can be easily studied. All that can be claimed for this method of examination of rocks is that it is a rude and simple way for determining some of the commoner kinds, but the application of the microscope is, of course, what must be trusted to for exact results.

A NEW town called Petroleum Center has been founded north of Albuquerque, N. M., at the recently discovered oil fields.



JARDINE'S STEAM WASHING MACHINE.

far off and so expensive to get to that there is not likely to be any very large exodus from this country.

FINED FOR HYDRAULIC MINING.—The cases of Yuba county vs. the Eureka Lake and Yuba Canal Companies Consolidated on one count, and of Yuba county vs. the Blue Tent Consolidated Hydraulic Gold Mine of California on three counts, and of Yuba county vs. W. H. Wiseman, all for contempt of court in violating the injunctions by prosecuting hydraulic mining, were heard in the Superior Court at Marysville, and in each case a conviction resulted. The Eureka Lake Company was fined \$500 and the Blue Tent Company \$500 on each count, or an aggregate of \$1500. Wiseman was fined \$50, but the execution in the latter case is withheld. The two corporations made no defence.

THE Sharon gateway, at Golden Gate Park, will be constructed of white marble from the quarry of Inyo county. One carload of 10 tons has already been received, and is on exhibition at Golden Gate Park. A contract has been entered into with the Inyo Marble Company for the delivery of 800 tons of marble, at a cost of \$12,000.

one is caused to revolve. It revolves about 20 turns in one direction and then stops and runs 20 turns in the opposite direction. The object of this is to prevent the clothes from forming in a ball as it winds and unwinds any hall that would form were it to run continuously. In the machine shown the automatic running gear is not the least valuable feature. In the first place, it is very simple and durable and not liable to get out of order. The pulleys, belts, etc., are all on top of the machine in plain view, and the gearing is also out of the way, so that clothes and other things cannot catch in the clutches. If these things are near the floor, as in ordinary machines, there is danger of accident.

The pipe shown on top of the machine is the hot or cold water pipe, and the steam enters through a pipe at the bottom and is carried clear across the bottom of the outside cylinder. This steam pipe is perforated with about 75 quarter-inch holes, and when the steam is turned on it not only quickly boils the water or soapsuds, but starts a rapid circulation. The rushing water and steam take the place of rubbing and "elbow grease," with which it is customary to accomplish the cleansing of clothes.

This is only one of the many laundry machines which are being introduced by the

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Machine Shops Here and Elsewhere.

Views of a San Francisco Mechanic Abroad.

EDITORS PRESS:—A journey beginning in June and extending through many of the principal machine shops in the Eastern States, then continued hither and through most of the heavy works on the Tyne, in the Manchester and Sheffield districts, has, as you may suppose, called up much thought and confirmed some old conclusions of mine respecting American manufactures.

I am, as you know, a believer in free trade, and have been denounced as an emissary of the Cobden Club. This subject I will avoid as much as possible with deference to the opinions of others, but not without asserting that my faith is one that professes more interest in American manufactures and our national success than those who hold to the "protective idea."

Mention is here called up by a recent visit of the Hon. T. G. Shearman, of New York, who has been in the Manchester district gathering, in a careful and impartial manner, facts and statistics, which he will no doubt give to the country in due time, and which should be of value on the ground that Mr. Shearman has no axe to grind or other end to serve than the good and honor of his country.

To come to things practical, what do you think of a conclusion like this? The Pacific Coast is in America the most advanced place in general and constructive engineering. This is my conclusion, taking into account *faibles accompli*, common and specific knowledge among engineers, the methods followed, the boldness of schemes and general skill. This considerable claim I venture to make, and like truthful James "will maintain." I saw in the Eastern shops an apathy and drifting with events that astonished me; old methods, tools and processes were just as I had seen them 10 years before. Some changes, of course, but nearly all in "extension of facilities," and but little in methods.

The equipment of the larger works in tools, lifting and handling appliances and in general character was, with one or two exceptions, inferior to our San Francisco shops. In Pennsylvania they seemed to be "waiting on Congress," but I am getting on dangerous ground. They were "waiting," however—that much is sure.

The tremendous resources of the country is a fact that continually thrusts itself upon one's thoughts. The Delaware River district, from Newcastle, should be, and some day, no doubt, will be the center of the metal engineering trades, as our English friends would call it.

The facilities cannot be surpassed, and are, to a great extent, utilized in, so far as works go. It would consume too much space to name over 20 or more establishments in this 40 miles, averaging more than half a million dollars of investment each, and almost idle at the time of my visit in July.

I claim, and moreover believe, the whole of the product of these works could now be going out into the world in competition with England, Belgium, Germany or any other country if the connection and circumstances existed to permit it. These European countries, amid advancing skill, have also advancing wages, a higher cost of living and a disaffection, we will call it, of skilled labor, that are great facts in the commercial future.

We little know, indeed, the important part that labor is now and in the future must play in European manufactures. I believe, and all statistics go to prove, that dear labor is the cheapest so long as efficiency is in proportion to rate; also, that the amount of labor in any particular commodity is not much different in different countries; further, that the rate of wages per diem is not an important matter in an economic sense, and of no use whatever as an illustration, without efficiency is taken into account. Wages may be higher in Portugal at 40 cents a day than in England or America at \$2 a day. It is the product divided by the rate that shows wages. This doctrine, as a proposition in productive economies, I think I was the first to promulgate, and it seems to be fast gaining acceptance.

Applied here in Europe, there is an element wanting in the fact that wages are forced up above efficiency by causes to be presently noticed. The men do not seem to care whether the work brings a profit or not; they look on capital as a kind of extraneous thing to be got at by any means, and not as a joint arm in their efforts. They moreover seem to look on work as a misfortune, hailing holidays with delight, and always ready for an excuse to "stop out." The cause of this most important feature, especially here in England, is due to two things: what I will call feudal organization, and the greater part of the wealth of the country being inherited. The British workman of to-day is not the ignorant man some of our friends would have us think. On the contrary, he is a thinking, reading man, and a very obstinate one.

He is surrounded on all sides by great stores of wealth, not gathered by his methods. He finds himself an equal factor in the government of the country now, with a vote; but his chances and position are not the same as others.

His "master" may have acquired a competence and wealth, starting at the same place and in the same way, but then his master is also unfairly treated, and there still remains a grievance, to so call it, in the fact a large part of community have not passed through this same school of drudgery, to which both he and his master have been compelled to submit.

By feudal organization I mean this patronizing of workmen in various ways intended as kindness, but destructive to that spirit of independent manhood that alone will produce a good day's work, and a desire to see capital have its share, after he has received wages in proportion to the work done.

Guns are now a great matter. The great works of Sir William Armstrong at Newcastle and those of Fentham Son at Sheffield, are busy making immense steel guns costing millions of dollars. The principal steel works are busy on armor plates. I have just witnessed the rolling of one 24 inches thick at the celebrated works of Sir John Brown & Co. of Sheffield. Thousands of tons of these are being planed, drilled, shaped, bent and sent off to various countries, who find it to their interest or expediency to devote wealth rising from industry to this wasted purpose, and in devotion to the old idea that to despoil your neighbor is to enrich yourself.

This, if not protection, is not free trade, and my opinion is, that among those agencies to prevent war, there is none that gives hope or promise in the future, except uninterrupted commerce between nations. The merchant and manufacturer must destroy the guns if it is to be done at all.

In shop manipulation I find great change and improvement in England—much more than was expected. American methods when superior are adopted without hesitation, and there is a kindly feeling toward the great republic among engineers, manufacturers and others, that makes one ashamed of the warlike spirit among a corresponding class in America.

We have much to learn from this older country as well as they have much to learn from us, and between the two both are going to have enough to do in competition with the continent where wages are following upward much slower than here, and slower than new methods and processes.

The great power of technological training, to which gunnery has given so much attention, is beginning to appear in various ways, which are apparent without explanation here.

The snow here is four inches deep and the ground has not been seen for eight days—one sign for that "remarkable climate" of Frisco. *Altringham, Cheshire, Eng. J. RICHARDS.*

Auriferous Sulphurets.

EDITORS PRESS:—In your remarks on the oxygen process, in the issue of the PRESS last week, you speak of the process as new, and that the Brin Brothers have succeeded in some way in making the basic oxide from which the oxygen is obtained indestructible.

Five months ago the thought occurred to me of using baryta as a source of oxygen in desulphurizing auriferous sulphurets, and I arranged an apparatus to carry the idea into effect, and found the mode wonderfully effective and rapid.

The basic oxide was first brought to a low red heat, absorbing additional oxygen from the atmosphere, and then the heat was raised to a low redness, and parted with its additional oxygen, which was carried into an iron revolving barrel, lined inside with a composition consisting of one-third asbestos, one-third fine clay, and one-third talc, resisting the highest heat. The barrel was heated from the outside, and a heat of about 700° to 800° obtained.

The action on the sulphurets was instantaneous and the reduction to oxides perfect. The mode was simple and entirely practical, and though only tried on 150 pounds of sulphurets at a charge, no doubt exists of its application to any extent. The saving in expense of construction and operation over the reverberatory or any other form of furnace for roasting ores was very great and the time of reducing a charge only two hours—a vast saving of time—the old modes requiring from 10 to 16 hours, according to nature of ores. I used the same quality of basic oxide in several charges and found it indestructible, therefore I do not see the novelty of the Brin method.

Wilson, in his "Inorganic Chemistry," at page 386, alludes to its indestructibility and that the same basic oxide can be used repeatedly to obtain a supply of oxygen. It certainly showed no loss of absorbing power in my repeated use of the same quantity and retained its quality in every trial with equal energy to absorb oxygen when heated to low degrees. I propose trying this mode of oxidizing sulphurets on a large scale—one ton to the charge—and will send you results observed.

I notice that your correspondent from Virginia City, describing the Comstock lode, speaks of Mt. Davidson having been named after Prof. Davidson. This is an error. The name was given the mountain in honor of the late Donald Davidson, who in company with Gen. Robert Allen, of the U. S. army, now in London, visited the Comstock, then known as the Washoe district, in the fall of 1859, shortly after the richness of the lode was brought to the attention of the world. This is history.

Gen. Allen, on the ground, proposed this name, and it was adopted at that time.

Some weeks ago I inspected a mine in this county that deserves mention in your columns, from the nature and richness of the ore it carries.

The sulphurets are arsenical pyrites found massive, and they assay over \$5000 per ton in gold. The mine is splendidly located for inexpensive work—fine water power of high head and wood in abundance. I note the fact of this mine for your columns because interesting in itself, and also for the reason that I do not know any other county in the State that yields in quantity this form of ore, and also that of petzite or tellurides of gold, made known by myself. They are the two richest known forms of gold ore: some have one and some have the other, but no other county has both in massive form.

LOUIS BLANDING.

Sonora, Tuolumne Co.

The New Gold Camp.

Arrow Mining District.

EDITORS PRESS:—Here are a few notes of observations made on a recent trip to the Arrow district mines in San Bernardino county. The mining camp is about 27 miles northwest of Fenner Station, A. & T. R. R., 581 miles from San Francisco.

The main ledge, from 5 to 25 feet wide, crops out over three miles in a north and south direction; the country rock west is granitic and east is porphyry; the ledge is, so far as explored, nearly perpendicular.

On several locations of this ledge the quartz is copper-stained, showing some hematite and pyrites of copper. In this quartz the gold is partly free and partly encased in hematite; by estimation made in burning out several samples taken from different parts of the ledge, the rock ought to pay from one to five ounces gold per ton.

At a distance of several thousand feet east from the main ledge are about six smaller quartz ledges, running nearly parallel with the main ledge; one, the Golden Queen, is explored by a tunnel 60 feet long and shows a vein about a foot wide, from which ten tons of the best ore were shipped to the Kingman sampling works in Arizona, which made returns of \$91 gold per ton; the second grade rock which is estimated at \$50 per ton remains on the dump for future reduction in the vicinity of the mine.

Some Mexicans work another small ledge by a shaft now 40 feet deep and take out and ship some very rich quartz.

Water is scarce in the whole district, and has to be hauled to the camp from a small spring three miles distant. Six miles from the main ledge is located the Arrow Weed spring, so called from a reed growing there which the Indians use to make their arrow with. It is the strongest spring in this district which by developing would furnish sufficient water for a 20-stamp mill. This estimation is made by experienced miners. There are several other smaller springs besides, which will be made use of at no distant day.

The road from Fenner to the mine runs through a nearly level desert; no trees in sight; a dreary country, where the prospectors have to pack the water along for several days before striking springs. Rattlesnakes and the like vermin are plenty, but are less of an impediment to the prospectors than the heat in summer.

The prospectors in those regions are entitled to all encouragement and to every cent which can be made there; but what assistance do they find in this city whose existence is founded on the enterprise, hardship and work of such hardy men?

When a liberal share of such a property as above reported is offered for assistance to develop its wealth, the miners are either treated as humbugs or impostors, or coolly answered that no miners are desired. The poor have not, and the rich will not. "We have been swindled so often and have lost so much money in mining operations, that we will not hear of it any more." That is the usual refrain, but if looked closely into, their mining (?) operations were nearly all conducted on California or Pine street, and the swindles performed by speculators and not by miners.

This Arrow district is no poor man's camp, where a miner may hope to make his pile; all claims are taken up.

Lumber is \$60 per 1000 feet; hay \$50 per ton, other things in proportion. There are yet only six tents in the district, where an enterprising traveler finds a hospitable reception by the boys. At Fenner there is a boarding-house (Hotel Fenner, they call it); its accommodations are good when considered from a prospector's standpoint, and charges reasonable.

The twenty-seven miles from Fenner to the mines may be made on horseback or by team; the fare of going and returning, 54 miles, is about the same as that from this city to Fenner, 581 miles. As strange as it sounds, there the mules have to make hay while the sun shines.

Probably the whole district will pass into more enterprising hands than can be found in this city, and just as likely draw its supplies from other sources. What of it? What do we care?

ED. WOLLER.

THE Boston and Montana Company's statement for January shows bullion product \$81,553; total disbursements, including salt, quicksilver, sinking shaft and winze, \$31,999; net profit, \$49,554.

Burning Liquid Fuel.

Mr. J. D. Bodwell, of this city, has for some years made a study of the question of the combustion of liquid fuel in ranges or stoves for domestic use, and has obtained a number of patents in this and foreign countries for his various inventions. Having put his devices to severe practical tests, which proved satisfactory, a company called the Pacific Coast Manufacturing and Transportation Co. was organized and is now engaged in putting up a plant to manufacture the liquid fuel and the appliances for its utilization. The buildings of the new works are nearly all up, and within a couple of months will be ready, some machinery being yet necessary to complete the arrangements. They have 16 acres of land on the bay shore near Shell Mound park, Alameda county, with a water frontage of 1337 feet, and extending back 525 feet, the track of the Northern railroad passing close to the rear of the land. The foundry building, which is 60x70 is all up, with several smaller buildings. There is also a boarding house, engines and boilers, deep well pump, etc.

The fuel used is not a crude petroleum simply, but a compound of petroleum and water, 20 per cent being water. A gas is generated from this mixture by the apparatus in the range or stove, and the gas is burned—not the oil itself. The presence of the water "mellows" the heat, being intimately mixed with the oil, strange as it may appear. Petroleum itself burns with a very intense heat, so that it is not adapted for use in domestic ranges, soon burning them out. The presence of the water overcomes this difficulty, and a pure petroleum gas is generated which burns well and answers its purpose admirably.

The Bodwell system of burning petroleum is entirely different from any before used. It has been in use in several places in this city for a year or more with satisfactory results. At the new works the product will be prepared for the market, and the ranges, stoves and burning apparatus will be manufactured for sale. Mr. Bodwell states that he has some 4000 orders to fill. He has applied his system to the ordinary form of range or stove which is intended to burn coal, but the conditions under which the solid and liquid fuels are properly utilized are so different that he had to devise a special range or stove in which the apparatus could be applied.

The apparatus for burning consists of a chamber of suitable size, closed at the sides, top and bottom, and having an opening near the top of one side through which the products of combustion may escape, and suitable draft openings to supply air. Within the range or chamber is a series of inclined plates or shelves over which the liquid to be burned is allowed to flow, falling from one to the other until it reaches the bottom or is consumed. When it is desired to heat water, passages are provided through which the water is allowed to pass and be heated.

The apparatus is not costly and is simple in construction and operation. The cost of the fuel itself is much less than that of coal or wood. The first is, of course, readily managed and regulated. To build the fire it is only necessary to turn a faucet and thrust a match into the fireplace. To extinguish the fire, the faucet is turned off. The heat will be regular and may be increased or decreased at will. Of course, there is no ashes and no dirt. As the combustion is complete there is no odor, and but little smoke. The cleanliness and economy of such a system will be apparent to all housekeepers.

The new works that are being built are intended to manufacture ranges and apparatus which are adapted to the flame produced by the Bodwell system. A range operated by this plan attracted great attention at the Mechanics' Institute Fair, and several restaurants and hotels adopted the system of using the apparatus and fuel. As soon as the new factory is finished the ranges and the product will be placed upon the market.

THE water in the Osbiston shaft of the Gould and Curry and Best and Belcher mines has been reduced to the 2100 level, and in a few feet further the third line of pumps will be reached and connected with, giving considerably increased drainage facilities. There is about 400 feet more of water yet to pump out, which is merely a question of time, as the pumping facilities are perfect, but the drainage of a vast extent of ground, not only in that mine but all the adjoining ones, has to be taken connectively into consideration, therefore too rapid progress must not be expected.

JAMES G. RULE has actively commenced operations under his engagement as superintending foreman, to develop and bring out the ore resources of the Gould and Curry mines above the 1600 level. He has about twenty men at work already on the 600 level.

THE Machinists' Union has appointed a committee to wait on the president of the South Pacific Coast Railroad Co., to ascertain the reason for sending East for two engines to be used on a cable road in Oakland, when they could be built here at the same price.

SOME abalone shells weighing ten pounds apiece were found recently during a very low tide on the rocks at Santa Cruz.

MECHANICAL PROGRESS.

A New Electrical Locomotive.

A decided departure from the practice hitherto followed in the construction of electric engines for working tramways has recently been introduced in an electric locomotive on the London, England, North Metropolitan tramway, by a Mr. Eliason. The London Times refers to this new device as follows: Instead of the electric motor being a fixture and having motion transmitted from it through belt gearing to the wheels of the car, the motor itself revolves, the motion being transmitted through bevel gearing. The system is the invention of Mr. Eliason, and the locomotive has been built by the Electric Locomotive and Power Company of London. The locomotive is similar in appearance to a short tramcar, and carries a secondary battery consisting of 50 cells. This battery is connected up with the electric motor, the motion shaft of which projects horizontally about two feet, and carries at its end a spur wheel which gears into a fixed circular rack. Thus when the motor is started it is, by means of this gearing rotated. A vertical shaft is attached to the under side of the motor, carrying at its lower end a bevel wheel which gears into one or other of two similar wheels on the driving axle of the engine. This mitre gearing is fitted with a friction clutch, by means of which the locomotive can be run either backward or forward. The 50 cells are equal to 250 amperes, and as the average consumption is stated to be 45 amperes per hour, it follows that there is a good six hours' supply of power carried.

The machinery is so arranged that a speed of eight miles an hour cannot be exceeded. Both the locomotive and the tramcar can be electrically lighted at night from the battery by means of glow lamps. We recently inspected the working of this locomotive at the tramway company's depot at Stratford, which was satisfactory in the limited space at command. It was started, stopped, and reversed very readily.

This machinery is of a simple character, and can be adapted to the tramcar itself in new stock. The Electric Locomotive Company are building a more powerful engine in order to demonstrate the application of the system on railway lines.

A NEW TEST OF BOILER STEEL.—Mr. Henry Schlacks, superintendent of motive power of the Illinois Central Railroad, uses a valuable shop test by drifting. That is, a $\frac{3}{8}$ inch hole is drilled in one corner of a piece of $\frac{3}{8}$ inch from each side and then drifted out. If the hole can be enlarged to $1\frac{1}{4}$ inches when the crack has just opened from the side to the hole it is good material. A $\frac{3}{8}$ inch hole in the center of a piece $3\frac{1}{2}$ inches wide should drift out to $2\frac{1}{2}$ inches to $2\frac{3}{4}$ inches when the crack runs from the side to the hole. But in the drifting test everything depends on the drifts and weight of sledge. The smaller or first drift should not be less than 12 inches long, $\frac{3}{8}$ inch at small end and one inch at large end, and finished on a lathe. The second drift should be 16 inches long, $\frac{7}{8}$ inch at small end and $1\frac{1}{4}$ inches at large end, while the third drift may be 18 inches long, $1\frac{1}{8}$ inches at small end and $2\frac{1}{4}$ inches at large end. A hammer not heavier than four pounds should be used, and the drifts should be oiled and driven from both sides, with not over four or five blows on either side at a time. If the drifts be short and blunt and the hammer 16 or 18 pounds, the enlargement of the hole at each blow is so instantaneous that the strain exceeds the strength of the steel, and even copper, under these circumstances, may be broken before it has drifted 1-16 inch. With light hammer and drifts, as described, a very satisfactory understanding, in a rough way, may be had of the ductility of steel.

NEW METHOD OF MANUFACTURING SHAFTING.—P. M. Haas, of Youngstown Ohio is the inventor of a novel method of manufacturing rolled and polished shafting. The round bar of metal delivered from an ordinary rolling mill and while at a cherry heat, is subjected to the action of a group of tapering condensing rolls which act peripherally and progressively upon the bar while the latter is rotating. After the bar has left these rolls, and when it is substantially free from heat, it is introduced into a die drawing machine of suitable construction. By this double manipulation the surface of the metal is first worked in one direction for producing a condensed scaleless surface, and then in a direction substantially at right angles to the first for producing the finish. The shaft when completed is said to be of uniform diameter and to have its surface metal condensed and hardened and free from pits and checks.

The tin bath used in tin-plating becomes foul by absorption of iron or other metal being tinned. The fluid tin may be poured off just above the melting point of the tin by allowing the bath to cool down slowly until signs of setting are noticed, when the pure tin will run off. The refining of the spongy mass or thick tin is too difficult for ordinary practice, and this is generally sold to chemical manufacturers or to brass foundries for brass alloys. Banca tin is supposed to be the purest and best for tinning purposes.

AN EMERY FILE.—An ingenious device for stretching emery cloth for use in the workshop has been brought out by Messrs. Edwards &

Co., of Charles street, Curtain Road, London. It consists of a couple of strips of wood about 14 inches long, hinged longitudinally, and of round, half-round, triangular or any other shape in cross-section. On the inside faces of the wood strips are pointed studs, taking into holes on the opposite sides. The strip of emery cloth is laid on to one set of the studs and the file as it is called, closed, which fixes the strip on one side. It is then similarly fixed on the other side, and thus constitutes what is called an emery file, and which is a handy and convenient arrangement for workshop use.

USEFUL INSTRUMENTS.—An ingenious instrument for ascertaining the distances of accessible and inaccessible points from the observer and from each other has been invented by Dr. Luigi Cerebotani, a professor of the University of Verona. This apparatus consists mainly of a pair of telescopes mounted on a stand and fixed on a tripod for use. The telescopes are both brought to bear on the object, and a reading is then taken from a graduated scale on the instrument, which, compared with a set of printed tables, gives the distance. By this means the inventor obviates the necessity for the base line, which has hitherto had to be laid down in these operations, and he dispenses with all trigonometrical calculations. Distance can be measured between the far off objects, and by means of a sheet of paper fixed on a drawing board a rough plan of the country under measurement can be sketched. In the same way the distances at ships at sea or of moving objects on land can be determined. The apparatus appears to be well adapted for land surveying, and particularly for military purposes. A practical trial has been made with this instrument on the Thames embankment, when its varied usefulness was demonstrated.

UNMAGNETIZABLE STEEL.—Mr. J. T. Boot omley has made some experiments with a piece of steel which was almost unmagnetizable. The steel was made by Messrs. Moses Eadon & Sons, of Sheffield, under Hadfield's patent, and contains 15 per cent of manganese. One side of the specimen has been polished and shows that the steel is capable of taking a very high finish. The present specimen has a tensile strength of 45 tons to the square inch. To test it magnetically the bar was first "touched" with steel magnets, but these had evidently no effect upon it. It was then placed between the poles of a powerful Ruhmkorff electro-magnet excited by 40 large tray Daniell cells arranged in fours for quantity and 10 in series. The bar was, however, still unaffected by the magnetism, so far as could be perceived by the hand. On testing it by a delicate magnetometer, however, it was found to show only a slight trace of magnetism.

SLOW UP OR CUT OFF.—A correspondent of an exchange says: "We have a 13"x20" engine running 114 revolutions per minute, and about half loaded. Which would be the better: to reduce the speed to 80 revolutions per minute, or to put a cut off on the back of main valve?" He gets as answer: "The cut off will give the best economy in fuel." We think that circumstances alter cases so often and so materially in steam engine practice, that our neighbor should have asked for further details before giving the foregoing "snap judgment." There are such things as wire drawing, back pressure and engine friction, which sometimes makes slower speed inadvisable.

COMMERCIAL EFFICIENCY OF ENGINES.—Outside of the question of the most economical boiler pressure and point of cut-off, to produce a given mean effective pressure, comes in that of the engine friction, which may be so great in large engines as to neutralize the economy of early cut-off. We might be getting a large engine and cutting off at 1-10 and using higher pressures, yet a given mean effective proves cheaper than by a smaller engine cutting off at 1-5 and using lower pressure, but the extra engine friction might neutralize this saving.—*Mechanics.*

A SINGULAR RESULT.—A correspondent of *Mechanics* writes that journal as follows: "Upon boring a three-inch hole through the length of a four and one-half inch solid cylinder of forged steel one foot long, so as to make a sleeve one foot long and three-fourths inch thick, without having to pay an exorbitant price for welded tube, we find our hollow cylinder is over 1 32 of an inch longer than the solid one from which it was made. Will some of your correspondents tell us why this is thus?"

TO TREAT WOODEN TOOLS.—The wooden parts of tools, such as the stocks of planes and handles of chisels, are often made to have a nice appearance by French polishing, but this adds nothing to their durability. A much better plan is to let them soak in linseed oil for a week, and rub with a new cloth for a few minutes every day for a week or two. This produces a beautiful surface, and at the same time exerts a solidifying and preservative action on the wood.

CAST-IRON PULLEYS.—can be lagged or faced with leather, without the use of rivets, in the following manner: First, brush over the face of the pulley with acetic acid, which will in a short time rust it and give it a very rough surface; then attach the leather to the face of the pulley with a cement composed of one pound of fish glue and one-half pound of common glue,

SCIENTIFIC PROGRESS.

OLDEST HABITATIONS IN AMERICA.—Major Powell, Chief of the Geological Survey, has discovered in New Mexico, near California mountain, what he pronounces to be the oldest human habitation upon the American continent. The mountains in this vicinity are covered with huge beds of lava, in which the prehistoric man and his comrades excavated square rooms, which were lined with a species of plaster made from the lava, and in these rooms were found various evidences of quite an advanced civilization, among them a species of cloth made of woven hair, and a large number of pieces of pottery. In the sides of the rooms cupboards and shelves were excavated. In the room, sticking out of the base face of the wall, was a small branch of a tree. When this was pulled out it was found that there was a hollow space behind the wall. Colonel J. H. Stephenson, Major Powell's assistant, broke this with a pick and found a little concealed niche, in which was a small carved figure resembling a man done up in a closely woven fabric, which with the touch of the hand turned to dust. It was blackened and crisp, like the mummy cloths of Egypt. In all, some sixty groups of these lava villages were found, there being twenty houses in each group. The evidences of civilization were similar, but removed by their crudity and want of skill a good deal from the articles found in the cliff houses.—*Santa Fe News.*

A LONG FELT WANT.—An exchange suggests that our scientists and inventors should cease vexing their brains about the photophones, the flying machine, perpetual motion, the north pole and the automatic car coupler, and endeavor to supply a long felt want in another direction. Bring forth some contrivance that will show at a glance the state of the atmosphere in a room so far as its purity or fitness to breathe is concerned, just as the thermometer discloses its temperature and the barometer its pressure. Let us have just such a convenient little instrument and it will prove a blessing to mankind, besides bestowing immortal fame and untold wealth upon its inventor. With such an instrument we might hope to demonstrate to the cold air fiend that pure air is not necessarily cold air. We should live longer, work better, and we should gain an immense advantage in our pursuit of happiness. Give the new meter any prefix you will, only make it handy and cheap, so that it may bang beside every thermometer in the land—and make it right away.

MOVEMENTS OF COLD WAVES.—The following conclusions are reached regarding the "cold waves," in a recent study by Lieut. T. A. Woodruff, of the Signal Service: The cold waves are found to follow an area of low and precede an area of high pressure. Within our territory they nearly always appear first at Helena, Montana, one of the furthest to the north of all our stations. The cold waves are observed to move thence in different directions: First, eastward across the great lakes and New England, not being felt south of the Ohio valley; second, southeasterly over the entire country; third, southward from Montana and Dakota to Texas and the Gulf States; and fourth, northeasterly over the Atlantic States. The waves travel from 50 to 100 miles an hour. They reach Omaha 8 to 16 hours after their appearance at Helena, the distance being 850 miles; St. Louis in 24 to 32 hours; Galveston, in 24 to 40; Buffalo, in 24 to 48, and Washington, in 32 to 56 hours.

FROST VS. LIFE.—In some recent scientific experiments on the effects of cold, two frogs were frozen solid in a temperature of about 20° F., and kept in that condition for half an hour. On thawing slowly they recovered perfectly, but it was found that longer periods of exposure invariably killed the animals. The experiment was tried of freezing hermetically sealed meat, so as to kill its bacterial organisms, and thus render it capable of putrefying. It was found, however, that so low a temperature as 80° below zero would not destroy the vitality of micro-organisms. It was thus made clear that the attempts to preserve meat for a long time by a momentary freezing of it must be abandoned.

A PITIFUL PENSION.—Prof. Huxley has accepted the pension of \$1500 per year granted him "in recognition of his eminent scientific services." It is a pity that the "recognition" of the services of the greatest British scientist of the time should be no greater than that often bestowed upon horse jockeys who are compelled to retire through overgrowth. But then Great Britain is a great and peculiar country, and John Bull, taken collectively or individually, is a peculiar institution—so says an exchange—but we fear that our own country and Government is not much in advance of England in its appreciation and reward of scientific research.

EXTINCTION OF AMERICAN ANIMALS.—Mr. Ernest Ingersoll, in a paper recently published by the American Geographical Society makes a startling record of the extinction of wild animals from this continent by the settlement of the country. Much of this lamentable decrease of animal life was unavoidable, but Mr. Ingersoll does well to descend upon the ruthless waste of one of our most valuable resources.

Only twenty-five years ago the great plains were covered with buffaloes and Mr. Ingersoll says: "I myself have seen steamboats halted on the Upper Missouri by swimming bands of these finest of wild cattle." But the extension of the Pacific railways has been made the occasion of a needless extermination of them. The elk, moose and deer have suffered a similar fate, until now it is said that the elk, which eight years ago were seen in thousands on the plains of the Sweetwater and in the Wind river mountains, have practically been driven to their last refuge in the southern Rocky mountain plateau.

Mr. Ingersoll shows that this baleful disturbance in the natural order of animal life is not limited to the land alone. Seals which once sported in the Atlantic surf along this coast southward to Cape May, have retired to the Newfoundland or Labrador coast. The habitat of the oyster on our Atlantic coast has seriously decreased. The feathered tribes especially the prairie chicken, the wild turkey, ducks and all game birds have been sadly depleted, and still the slaughter goes on almost unchecked.

Mr. Ingersoll suggests that an arrest might be put upon this uncalculated destruction by making and enforcing "a law which should permit so-called sport to be indulged in only by a selected few who had proved their capacity for common sense and self-restraint."—*N. Y. Herald.*

ASTRONOMICAL.—Progress in astronomy can only be made by a division of labor and concentrating certain points upon some one particular object of research. Our principal observatories all work at specialties. At Harvard the relative magnitude of the stars is the chief object of study; at Princetown, spectroscopy; at Alleghany Observatory, the dark part of the solar spectrum, and the effect of the invisible heat rays on the earth; at the National Observatory, positions and orbits of satellites; at Cincinnati, double stars; at Chicago, Jupiter's surface, and at Albany and Yale, perfecting maps of the heavens.

A PREHISTORIC TOOL.—While digging a cistern near his residence, Dr. C. L. Metz, of Madisonville, Ohio, made a very valuable find, which will be of interest to scientists; it being a paleolithic implement, supposed by him to be a scraper. It is about two inches in length, blue flint, and very rudely chipped. Dr. Metz is Superintendent of the Ohio Explorations of the Peabody Museum of Archeology and Ethnology, Cambridge, Mass. He is very much elated over his find, and declares it to be the first tool used by the inhabitants of North America, before the glacial period, ever found anywhere in these regions.

INDIA INK AND INFUSORIA.—M. Leo Errera considers India ink, on account of its harmless and its intense coloration, a valuable aid in the study of certain microscopic organisms. He has kept infusoria, etc., alive for several days in a solution of that ink, the carbonic matter having little or no effect upon the life of such objects. For making durable preparations ink diluted with water is gradually replaced by ink diluted with glycerine. Many organisms which are distinguishable with difficulty in clear water are easily observed in water charged with India ink.

ENERGY OF THE ELECTRIC LAMP.—Penkert, a European chemist, has ascertained by experiment, the relative portions of energy transformed by the electric lamp into light and into heat. The result shows that in the Swan system the proportion of the energy transformed solely into light is 28.1 per cent. In the Siemens it is 27.9; in the Edison, 26.3, and in the arc light, 38.3.

ANOTHER NEW SOURCE OF TANNIN.—A New Zealand conifer resembling the yew tree has been discovered by an American to be remarkably rich in tannin, the percentage being 28.66, as compared with 24.18 for sumac and 8.85 for oak, and considerable quantities of the bark are being imported at \$40 per ton, exclusive of freight.

LONG DISTANCE TELEPHONING.—An extraordinary feat in telephoning was recently accomplished between St. Petersburg and Boulogne, a distance of 2465 miles. Conversation was kept up, notwithstanding a rather high induction. The Russian engineers hope to succeed in conversing by telephone over a distance of 4665 miles.

ACID FUMES AND VEGETATION.—Careful observations by Sebroder, in Germany, show that one part of sulphuric acid in 54,000 parts of air will cause a serious damage to plants in a very short time. Coniferous trees are more sensitive than deciduous. Fruit trees are very sensitive.

THE EARLY ASTRONOMERS.—The completeness of the work done by the earlier astronomers is shown by the fact, recently stated, that out of the 6000 or more nebulae now known the Herschels had discovered 5000.

COPPER AND COBALT.—The valuable alloys of copper and cobalt are obtained by melting in a crucible metallic copper and cobalt under a flux composed of boracic acid and wood charcoal. They have a red color and a fine silky fracture.



A. T. DEWEY.

W. B. EWER.

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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO:

Saturday Morning, March 13, 1886.

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Passing Events.

The discovery of gold fields in Central and South America noted in another column, is attracting some attention among miners, but so far very little is known concerning the extent of the finds. Gold discoveries are generally more or less exaggerated when first announced. It was not long since that Africa was to be the new El Dorado, but the excitement there has died out.

The discovery of new petroleum fields in New Mexico is creating quite an "oil fever" in that region, and a number of prospecting wells are being bored.

On another page of this week's PRESS will be found an interesting letter describing the new gold mines in San Bernardino county. The writer lately visited the Arrow mines, and writes understandingly concerning the new camp.

The supply of snow in the mountains insures a good water season for the miners this year, though a good deal of water will run to waste owing to the prevention of hydraulic mining.

FULLY 2000 men are at work on the California and Oregon Railroad above Delta.

Wooden and Iron Ships.

We have on this coast as good facilities as there are in the world for the construction of wooden vessels. The ship-timber is most excellent, and the spars of nearly all the sailing vessels of the world come from here. Our timber is so long that very large vessels can be built without "butts"—that is, without planking or single lengths. The climate admits of men working out-doors all the year round along the coast. The timber resources are most extensive. So far, our builders have confined themselves mainly to coasting vessels, schooners and ternes, though a few square-rigged craft have been constructed and have given good accounts of themselves both in speed and strength. While we are engaged in building up our home industries this is one which well deserves attention and aid. Our material is of the best, and the other facilities are not wanting. It would seem that this is an opportunity for capital that should no longer be overlooked. It is not the biggest yards, either, that make the largest profit. In fact the United States Commissioner who has looked up this subject gives it as his opinion that one of the great drawbacks is the conversion of small yards into large manufactories, with extensive plant and comparative high cost of labor.

Although iron and steel ship-building is on the increase in this country, some persons are beginning to doubt the prevailing opinion that iron vessels will last double the time of wooden ones. There are plenty of wooden ships of 30 or 40 years of age still doing good service.

It was thought not long since that underwriters were prejudiced against wooden ships, and to test the matter circulars were sent out by the State Department, to the Consuls at foreign ports. The report respecting grain cargoes arriving at Liverpool are of special interest to us on this coast. We will therefore take 100 grain-laden ships, leaving the Pacific Coast to discharge their cargoes at Liverpool.

The record of 46 wooden vessels with cargoes of 1500 to 3000 tons, was as follows:

Condition.	No. of vessels.	Per cent.
Landed in perfect order.....	21	52½
Slightly damaged.....	8	20
Damage to 100 to 500 bags.....	5	12½
" " 500 to 1000 bags.....	4	10
" " over 1000 bags.....	2	5
Damaged by heating.....	0	0
Totally lost.....	0	0
	40	100

The record of 60 iron vessels with cargoes of 1500 to 3000 tons, was as follows:

Condition.	No. of vessels.	Per cent.
Landed in perfect order.....	31	51.7
Slightly damaged.....	7	11.7
Damage to 100 to 500 bags.....	6	10
" " 500 to 1000 bags.....	5	8.4
" " over 1000 bags.....	8	13.2
Damaged by heating.....	2	3.3
Totally lost.....	1	1.7
	60	100

The performance of 59 vessels built gave an average passage of 127.41 days; and the 40 wooden ships an average of 122.94 days. Of the iron ships nearly all were British, and the entire 40 wooden ships were American.

These figures make a very good showing for American wooden vessels, both in speed and the way they turn out their cargoes. The condition of the cargo at the end of the voyage is a highly important item. Our percentage of "slightly damaged" was larger than the English ships, but the "damage to over 1000 bags" gave a high percentage against the iron ships.

If wooden ships can make such good records as these official figures show, especially in our own class of trade, it would seem that we ought to build wooden ships ourselves, instead of using only those built on the Atlantic coast. Certain it is that the ship building business on this coast is one to which capitalists should turn their attention with the view of making it one of the leading industries.

DURING the month of February the Secretary of the Treasury purchased 1,450,000 ounces of silver for coinage into standard dollars, being about \$500,000 less than the usual monthly purchases. It is explained at the Treasury Department that the amount of silver fell short because no more was offered at the market rates. The price was higher, owing to the increased expenses of transportation during bad weather, which prevailed during the month.

WORK has been suspended on the Howland antimony mine on account of low prices.

The Mechanics' Institute.

On Saturday last the annual meeting of the Mechanics' Institute was held at the library, and the yearly reports of the officers were presented. They show the total number of members of the Library Association in good standing to be 2535, of whom 172 are life members, 2355 are subscribing members and eight are honorary members.

The library now has 39,246 volumes, including 3302 bound volumes added this year. The outside circulation during the past 12 months has been 72,121 volumes, being an increase of a little over 42 per cent in one year.

There are 348 daily, weekly and monthly papers and periodicals on file in the reading-room, giving the latest information on all subjects from every part of the world.

Three classes have been established in mechanical, free hand and perspective drawing, geometry and trigonometry, and in the Spanish language.

The receipts of the library and rental from a part of the library building during the year amounted to \$22,199.10, and the expenditures to \$19,999.50, showing a net gain on the library alone of \$2199.60.

The net profit of the Twentieth Industrial Exhibition was \$21,706.95, and the rental of pavilion and other property \$14,245.75. The disbursements have been \$38,350.65, including a reduction of \$23,000 on the mortgage debt, leaving a balance on hand March 1, 1886, of \$1195.40.

The assets of the association are as follows:

Pavilion block.....	\$300,000.00
Pavilion and other improvements.....	94,664.44
Lot and library building on Post street.....	100,000.00
Library of 3924 volumes.....	87,915.72
Money in the treasury.....	5,916.78
Money with librarian.....	552.36
Total.....	\$648,149.30

The liabilities are a remaining mortgage debt of \$110,000, leaving a balance of \$538,149.30.

The librarian was directed to prepare and have published a catalogue. A large expenditure for books was authorized.

The officers of election reported the names of the following gentlemen for trustees, to serve the ensuing two years: P. B. Cornwall, J. A. Bauer, D. A. Macdonald, David Kerr, W. P. Stout, John Mahoney and George H. Hopps. The meeting then adjourned.

The board of directors then met in session, and the newly-elected officers were installed, with the exception of Mr. Kerr, who was absent. P. B. Cornwall was chosen president for the fifth time, and the other offices were filled as follows: David Kerr, vice president; J. A. Bauer, treasurer; James Spiers, corresponding secretary, and W. P. Stout, recording secretary.

New Pumping Machinery.

The San Francisco Tool Company are now engaged in building some very extensive plants of pumping machinery, mainly for irrigation purposes. One novel piece of machinery they are building for Kenyon Cox Esq., of Anaheim. It is a centrifugal pump, resting on the top of a circular receiver, which is connected with sixteen different driven wells, located in a double circle around the pump. All these wells are drawn from at once, the flow of water being 118,000 gallons per hour, or 2,832,000 per diem—a veritable river from one piece of machinery. The question of irrigation is easy of solution where such plants can be put in operation.

They also have in process of construction a 15 inch centrifugal pump, with a capacity of 14,400,000 gallons in 24 hours, to be used for reclaiming land near Lodi, San Joaquin county.

They are building a plant also for Francis Smith, iron-pipe manufacturer of this city. It is a double-runner patent pump, with single-acting engine. The capacity is 1,440,000 gallons, 50 feet high every 24 hours, and it is to be placed near the town of Santa Clara. The San Francisco Tool Company make a specialty of irrigating and reclamation machinery, and have been very successful with their plants.

PRACTICAL HYDRAULICS.—We are asked by a subscriber at Georgetown, Colorado, who does not give his name, what the price of "Randall's Practical Hydraulics" will be when issued, and also the date of publication. The price will be \$2, and it will be several weeks yet before the work is ready for delivery.

Ore-Grinding Pans.

In working gold and silver ores by the continuous process two or more pans are used for grinding the pulp before it passes into the other pans for amalgamation. The objection to this plan is that a large percentage of the ore is sufficiently fine when it leaves the battery and needs no further grinding, but this all goes into the pans together with the coarse ore and is passed beneath the grinders, thus using unnecessary time and power, and much pulp that needs no further grinding is ground, and some that needs it is not ground.

Mr. Julius A. Bidwell, of Ivanpah, San Bernardino county, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency a form of pan to overcome this objection. A central well is formed in the pan, which is securely fastened to the muller which carries the grinding shoes. Upon the top of this muller, which is slightly contracted at the upper end, is secured a funnel-shaped screen. The bottom of the well opens through to a point beneath the muller.

The pulp from the battery being fed into the funnel-shaped screen passes over it, and as the muller, well and screen revolve, the fine pulp passes through the screen and down into the outer circle of the pan, above the surface of the muller, so that it may be discharged through the regular discharge opening, without passing beneath the muller at all. The coarser particles pass down through the well, and are forced beneath the grinding shoes by gravitation and the weight of the superincumbent column working gradually outward into the outer circle of the pan, from which they pass with the other material through the discharge opening or passages and into the amalgamators. By this construction, only that portion of the ore which is so coarse that it needs to be ground, is passed beneath the muller, and much time and expense is saved, while the grinding is much more perfectly done.

Mr. Bidwell has also patented an attachment to an amalgamating pan, by which the temperature of the material within the pan may be accurately known at any time. Pulp is usually heated to a considerable temperature to effect a favorable action in amalgamation. It is well known, however, that different ores require a different heat to produce the best results, and to accurately regulate this temperature it is necessary to plunge a thermometer into the mass from time to time. This is an inconvenient operation, and is very apt to break the thermometer, besides which, it is frequently neglected by the operator.

Mr. Bidwell's improvement consists of a thermometer of that class in which the lengthening and shortening of a steel spiral operates the index hand in position, which moves over a dial, an extension within which the spiral is contained, and a chamber formed in the side of the pan, into which this portion of the thermometer projects, so that without being introduced into the pulp, it is surrounded by it, so that the temperature is accurately recorded at all times. The conductive power of the metal chamber and casing will be sufficient, so that the thermometer will be acted upon and will indicate at all times upon the dial the temperature of the contents of the pan.

THE dividend of the Bald Mountain extension (Sierra county) drift mine, paid on the 1st inst., returns to the investors over half the assessments paid in opening the claim. The lead is now widening and is being followed on another bend westward up the Pliocene ridge. It is now believed that at least 2000 feet of the Ruby channel is on the Bald Mountain extension claim. That makes three gold leads they have, so far as known. The late snow-storm insures a good water season for the miners of that region.

RECENTLY the Sutro Tunnel Company commenced suit in Virginia City, Nev., to recover \$8824.50 from the Overman Silver Mining company, alleged to be due on a contract for the construction of a tunnel running through the Overman mine and tapping the Sutro tunnel. Wednesday the Overman commenced suit in this city to declare void the contract by which the tunnel in question is alleged to have been completed, and to restrain the Sutro company from any further proceedings in the matter.

Silver and Gold from Black Copper.

No. 1.

The ores treated at Oker were from the Harz mountains. They are lead ores mixed with pyrites, blende, barytes, chalcopryite and from 25 to 40 per cent of sulphur. They also contain small amounts of manganese, cobalt, nickel, bromide, arsenic and antimony. They are divided into five classes, and the working of the ores comprises seven distinct processes. They are mainly interesting for the separation of the silver and gold, which is done in several ways, one of which, the separation from black copper, is described by T. Egleston, in the last report of the Director of the U. S. Mint.

The lead ores are first washed and then leached with water to extract the zinc sulphate. This purifies the lead ore and gives a blue sulphate containing three per cent of impurities, the greater part of which is manganese. It is melted in its own water in a copper vessel, sifted to separate the large pieces and sold. The leached ores contain lead, copper and silver. They are treated in Piltz furnaces, which give lead and a lead and copper matte. The copper matte produced is roasted and charged in the furnace.

The mixed ores containing lead and copper are roasted and melted producing a lead which contains silver and a copper matte which is treated with the other copper mattes. The lead is cast in little round cakes, .20 meter in diameter and about .16 meter thick. They contain a great deal of copper. To purify the metal it is melted in large iron kettles holding about 10 tons. The scums taken off are liquated in the next kettle and are treated for copper.

The silver lead is cupelled in cupel furnaces, of which there are three, two with movable hearths, and one with a fixed one. They all work with coal. As there is an easy sale for the litharge, the lead is purified in the kettles, and all the pure litharge saved and sold. The screening is done in an ordinary trommel. The litharge is packed in barrels. There is no special arrangement for taking off the lead vapors, and cases of lead-sickness are quite common. It would be very easy to protect the men if the old ways of doing things were not kept up. Nothing is more remarkable about these works than the way old processes have been preserved.

The rich copper ores are smelted for a matte of 35 to 40 per cent copper, concentrated to 65 to 70 per cent smelted in black copper and treated for silver.

The ordinary copper ores are roasted with salt, leached with weak acid, and precipitated with iron or iodide.

5. The concentrated mattes and the cement copper are treated in a reverberatory furnace. The silver is concentrated in bottoms, part of which is cast into plates for the electrolytic process, and part is granulated for the extraction of silver. The rest is copper poor in silver, which is sold.

The granulated copper is treated with weak acid for copper sulphate, and the gold and silver residues smelted.

The silver is parted by solution in sulphuric acid and precipitated with copper.

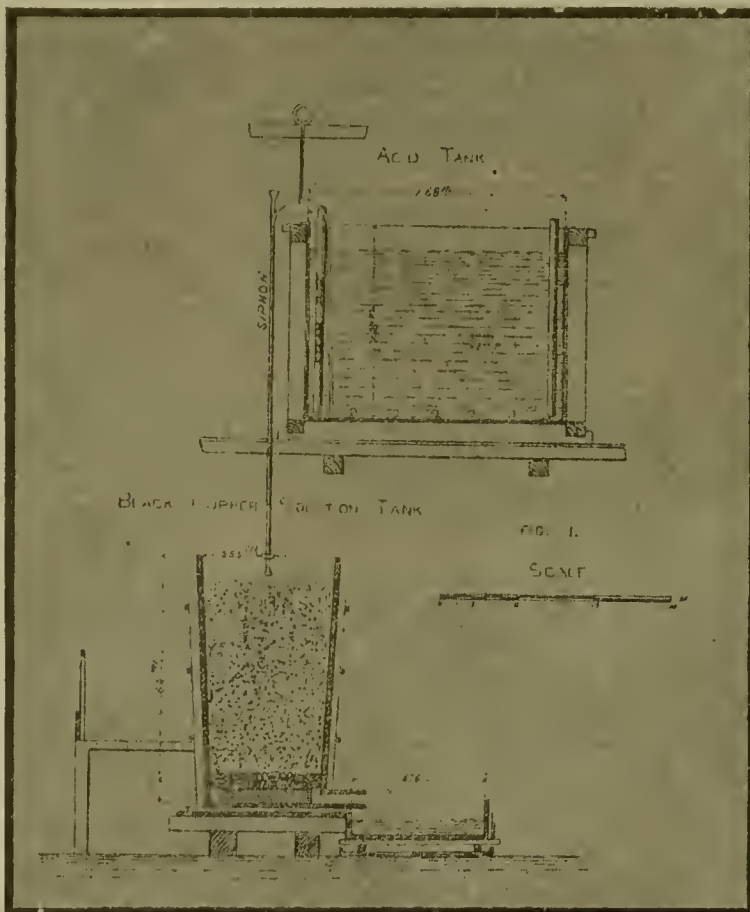
The process of the separation of the silver from the black copper consists of several operations:

The silver is concentrated in bottoms in each a way as to make them almost entirely free from iron, cobalt and nickel, whose presence is objectionable because these metals gradually increase in the mother liquors and make the quality of the product impure, unless they are from time to time withdrawn from the circulation and treated for these metals. The iron sulphate cannot be separated from the copper sulphate without a special oxidation to make insoluble sesquioxides. The nickel and cobalt could be crystallized out, but this complicates the process unnecessarily, so that they are separated as far as possible in the dry way. The silver having been concentrated in the copper in a reverberatory furnace, is ready for treatment and is granulated as it is cast from the furnace. This concentration makes it possible to produce about half the copper made at these works to contain only .07 per cent of silver, which is so poor that it is sold. The other half contains .16 per cent, and this is granulated. The object of the granulation is so to multiply the surfaces of contact that the

solution may be made in the shortest possible time. It is done by causing the copper to run in a thin stream from the furnace into a water tank into which a stream of water runs continuously to keep down its temperature. The copper is made to run across this stream of water. If it is at the proper pitch and temperature the granules are formed perfectly, but there are many precautions to be observed. The copper must be sufficiently refined, and at as low a temperature as it will run, to avoid the danger of not cooling the copper sufficiently. The depth of the water and the supply must be sufficient to have the water cool enough at the bottom to insure that the copper will remain solid. To make this certain, the cold-water supply in some works is divided; one runs in at the top, crossing the copper stream to scatter the copper; the other is carried down by a pipe to the bottom of the tank, to insure the cooling of the mass there. If the copper is very hot, or the stream of metal too rapid, or the supply of water not sufficient, there might be danger of the copper being at such a temperature as to undergo only such a superficial

it. They are supported from the roof. Each one of these siphons communicates with the copper solution vats below. (As shown in the cut.) The spent liquors from the crystallization-tanks are pumped up into the acid-tank with a Kortings injector made of lead, the points of which are made of very hard lead. The liquors are concentrated with fresh acid at 50° R. to 30° B, and the acid mother liquors made to flow over the granulated black copper contained in the leaching-vats below. These are conical, .88 meter in diameter above and .72 meter in diameter below and 1.62 meters high. On the bottom of the tank, on both sides of the bottom opening, pieces of wood about .15 meter high are placed. Over these a few large pieces of copper are laid on as to prevent the grains from passing through them, thus forming a false bottom. The tank is then filled with the granulated copper.

Between the real and the false bottom there is an opening .10 meter in diameter, with spout 0.38 meter long, which projects over a shallow launder 0.88 meter wide. These tanks are hooped on the outside and lined on the inside



APPARATUS FOR THE EXTRACTION OF SILVER FROM BLACK COPPER.

cooling that, when it is altogether in mass at the bottom of the tank, it will readily become liquid again. The grains are sometimes cast hollow, but this is done only when the copper is to be oxidized in a furnace, and not, as in this process, by means of air and sulphuric acid.

The solution of the black copper granules in the acid mother liquor is done in a large building with several stories. In the upper one there are four lead-lined vats, 3.60 meters long by 1.70 meters deep, by 2 meters wide, in the clear. (See engraving.) They are held together in frames which are 15 centimeters square. The whole vat before putting in the lead is painted inside and out with tar to prevent the absorption or loss of the liquors in case of a break in the lead lining. All the wood of the building is treated in the same way. These vats are heated by steam to 70° R. At the end of every row there is a tank one meter square in which the steam is condensed. The lead to line the vats weighs eight to twelve pounds to the square foot. The pipe for heating the liquors lies on the bottom of the tank and turns on itself seven times. It is of lead .05 meter in interior diameter and .005 meter thick; both ends of the pipe are turned up. In each one of these vats there are four lead siphons, each one of which has a stop-cock at the bottom to regulate the flow of the acid, and a funnel on the side with which to start

with lead, 16 to 18 pounds to the square inch. The acid mother liquor is turned on to the granulated copper by the siphon-cock until it is wet. The acid is then turned off and the air left to act on the grains of copper, which it does rapidly, as the surface of copper exposed to the action of the air which draws up through the mass is very large. The outside of each grain is thus transformed into a very thin, black film of oxide of copper. The acid is then turned on again and dissolves out the oxide thus formed. This is repeated every three-quarters of an hour. The clear color of the liquor running out shows when the oxide of copper has been dissolved, and the liquor is then turned off until the black film forms again. As the copper dissolves out the tank is filled up.

In the New York suit brought by James M. Selover against Ashbury Harpending, involving the purchase of 5000 shares of State Line Gold Mining Company, for which Harpending was to be responsible in case of loss, a verdict has been found for the plaintiff for \$18,000.

There is no mining news of late from San Gabriel canyon or Rivena. The dividing rod business did not work on the Chaffey silver mine in Kern county.

ANTI CHINESE leagues are becoming popular in the mining sections of the State.

The Hard Times.

Times are hard and reduction of expenses in many cases is a necessity. Much judgment should be exercised in cutting off that which can be spared with least injury to one's industry and comfort. Those who may think that economy requires the stopping of a subscription to a good newspaper are liable to make a serious mistake. It is just when times are hard and especial effort is needed to make both ends meet that there is most value to be found in a journal, which presents the newest thoughts and the freshest experience. Many times suggestions of new ways to turn productive effort to account or cheaper ways to do common work, or means of saving valuable property from loss can be learned and made use of just at the time when such hints are most valuable. The testimony of our readers is that such things have happened in their experience many times. A good paper devoted to a special class of industrial work is a valuable aid and adjunct. It is like a good tool or implement, and to attempt to economize by stopping it would be much like a mechanic attempting to cut down expenses by doing without his grindstone, or some other very essential and useful aid in his work.

Aside from the direct and practical assistance which a good journal gives, there is the cheer and encouragement to be derived from its familiar columns and which serve an excellent purpose in maintaining the spirit and zeal of the reader, even amid troubled times. Such a paper becomes a valued friend in the family, and its loss is seriously felt by all. It is also an agency for the development of the intellect and the moral sense—a most valuable educational agency secured at a minimum cost. And it should not be forgotten that if we do not embrace passing educational opportunities, we cannot go back for them as we might to take up less essential advantages. There are a host of ways in which a true, conscientious journal wins esteem and returns value to its patrons—and at no time is it more necessary or desirable than during what are called "hard times."

In the case of the MINING AND SCIENTIFIC PRESS this is particularly true. Miners must keep pace with all improvements in both mining and metallurgy if they are to obtain as good results as others. During the past few years we find it possible to work mines that were formerly unprofitable, owing to improvements in methods and systems. Men who are hard at work on their own properties have little time to hunt up such matters. They depend on the technical journal to tell them what others are doing in their special branch of business. This is one of the special aims of the PRESS: to collate from all available sources the experience of practical men and lay it before others in the same lines of work. Improvements in processes, changes in systems, details of work, results of novel operations are all of practical, every-day use to the miner, millman or smelter. Changes in the mining laws, decisions of the departments and the courts, and such legal matters, all have their influence on the mining industry, and these we carefully watch for the benefit of our readers.

Aside from this the reader of the PRESS is kept posted on mechanical and scientific progress, and the general events of the scientific, mechanical and mining world. The letters of our numerous correspondents, describing new regions, the condition of various camps, the improvements going on, with suggestions and experiences on all sorts of subjects, are of great value to the reader. The harder the times are the more need has a man to learn methods and facts which will economize his labor and cheapen his outlay. And, moreover, during these periods of depression, the greater trouble will the editors take to procure information of economic value to the readers. No reader of the MINING AND SCIENTIFIC PRESS can afford to cut it off if he is reducing his expenses, for he will find it a constant aid to him in his business affairs.

EX-SENATOR CHAFFEE, of Colorado, well known among mining men from his connection with Leadville mining interests, died on the 9th inst.

On Monday, three miles above Dexter, J. J. Noonan struck the richest quartz ledge yet found in Shaasta county. The vein is seven feet wide.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ZEILE.—Amador *Ledger*, March 4: The Zeile shaft is being repaired as rapidly as possible although the extent of damage below the 700-foot level is not yet known. It is believed, however, that another week or so will see the shaft in working order again throughout its entire depth. The mill is running steadily, although not to its full capacity. At the San Joaquin mine at Pine Grove, the pumping machinery has been started, and is working nicely. A week more is expected to clear the shaft of water. Mr. Hoffman of Santa Cruz, President of the Volcano Gold Gravel Mining Company, is in Volcano looking after the interests of the company.

SUTTER CREEK.—Steam was started at the Mahoney mine on Monday afternoon, but in keeping with the luck which has attended the operations at this mine for years, a break occurred a few minutes after the machinery was put in motion. The main driving pulley flew to pieces, and everything was brought to a sudden halt. The mishap is attributed to the fact that the works have been idle so long that the machinery run hard. The broken wheel, which was of cast iron, is to be replaced by a wooden one, well braced with iron, which is considered safer and more durable than the old one. Walkmeister of the planing mill has the job of making it, but it will not be in place for a week at least. The eight teams which have been hauling wood are laid off temporarily on account of the rain.

Calaveras.

A \$5000 CLEANUP.—Calaveras *Chronicle*, March 4: Mr. R. M. Ward, who is working a gravel claim in the old Gwin Mine gulch, made a cleanup Tuesday last, after a four days' run, the yield being \$5000. The work was all done by two men.

PATENT ISSUED.—Last Saturday Representative Louttit received word from the Interior Department that a patent had been issued to James Watson for the Gem mine near Angels camp. This case has been pending in the Interior Department since 1878.

El Dorado.

GOPHER.—Georgetown *Gazette*, March 3: Work on the Gopher mine is reported to be carried on with flattering prospects, and the prevailing opinion appears to be that it only needs to be properly managed in order to prove successful. A large number of men are employed and the 20-stamp mill is kept constantly engaged in crushing ore. Under the excellent management of the present Supt. F. E. Morse, it bids fair to equal if not excel the best paying mine in the county. Dr. Spencer having milled 28 tons of the mixed ore and bed-rock from the dump on his claim east of town, in the Eureka mill, is so well pleased with the result, that he will immediately begin further development of the mine. The ledge is of good size, and will probably mill at least \$10 per ton. The result of this test has greatly strengthened the confidence of our mining men in what is known as the "Dana lode" lying to the east of town, and four new locations have been made. The doctor has arranged for the use of the mill, and will resume crushing in a few days.

Inyo.

THE MARBLE WORKS.—Inyo *Independent*, Mar. 6: At the Marble works Mr. Luce is pushing his preparations as rapidly as possible to open up the quarry extensively. A new boarding house is now well along toward completion; when this is finished twenty-five men will at once be put to work, and more force will be added as new ground is opened up. Already there is quite an air of activity at Swansea.

FROM THE LOWER COUNTRY.—Inyo *Register*, Mar. 6: Surveyor S. P. McKnight returns here now after a sojourn of several months down in the Darwin-Panamint region. Only four men are working on the Panamint mill, so it is not likely its whistle will be heard for some months yet. Work is going on quite generally throughout that country, but no strikes of importance are reported.

POLETA.—John Clarke's teams bave for some time past been employed in hauling ore from the Polata down to the railroad. We are informed that about ninety tons are now ready for shipment. The ore will be taken to the Maxim mill, of which Mr. Storey now has control.

Monterey.

SILVER.—Cor. Salinas *Index*, March 4: Arriving at Soledad, the sole topic of conversation was the discovery of gold and silver bearing rock in the mountains overlooking Poverty Flat, about eight miles south of town. There are various accounts of the quality of this rock, your correspondent being informed by one man that it had assayed in the city as high as \$300 per ton; others said it was nothing but chrome iron. At the base of the mountain I was informed that it assayed only \$7.40 per ton and was worthless; again I learned from reliable authority that it assayed \$10 per ton. Passing up the road several camps were visible on top of the mountain, where a number of claims have been already staked out.

Napa.

CINNABAR.—Calistogan *Index*, March 3: Another discovery of ore that promises to be of much value has lately been made in the well known Napa Consolidated Quicksilver mine. From present appearances it will keep the miners busy several months. M. T. Brown, the present superintendent, has been successful in his work at the mine, and the stockholders will very likely soon begin to receive dividends again. When he took the property in charge he immediately stopped the loss of money, made it pay expenses, and he now has cash in bank to the credit of the company.

Nevada.

A REVIEW.—Foothill *Times*, March 4: The Empire mine is looking well in its lower level, and has more quartz than the present mill can handle. The Empire is run by steam, but one month of good weather will see the water wheels turning the machinery at this famous mine. The New York Hill Company have found a good ledge in the 13 level, north. This is the lowest level in the mine, and the fact that the ledge found there is quite large and

shows well in gold, gives great encouragement to the owners. We saw some of the ore at Peter Johnston's store, and it is certainly fine rock. The lessees of the Coe mine have about cleaned out the drift in the east shaft. Saturday evening the miners took out quite a lot of specimens from this mine, and general character of the ore is considered good. The drift at the depth of 60 feet in the Coe mine will be run toward the Powning mine (east) where the company expect that a body of good milling ore will be found. Crown Point is still turning out good ore, and at short intervals yields up more gold than rock. This summer the mill and machinery at the Crown Point will be enlarged. Ore is now being hauled to the custom mills from the Alpha mine and a contract will be let for sinking the shaft 200 feet deeper. This mine is located on the hill opposite the Idaho, and is being operated by a party of San Francisco capitalists. Yesterday the Idaho Mining Company let a contract for running the tunnel and making the ditch which will carry the water to the Badger mine. John Bennett got the contract and commenced work this morning. The tunnel and ditch will be between 300 and 400 feet long. Work of putting up machinery will soon commence. The tunnel and ditch will take the water from a point near the Crown Point mine, which latter mine will also be furnished with water by the Idaho company. The Wide Awake mine, on Deadman's Flat is showing up good ore. This property is owned mainly by Messrs. Wiley & King, and although they have been working it but a short time, they have taken out several hundred dollars in specimen ore. The ledge is about 18 inches in thickness, and the Co. will soon have a crushing of rock. The Phoenix Co. is drifting and stopping in the 30 level north and south. The levels are in about 60 feet from the shaft. The ledge in these levels is from 8 inches to 2 feet in thickness and is considered to be better rock than that recently crushed. The company and also the tributaries are now taking out ore for the mill, and will soon have another crushing. The last rock crushed for the tributaries paid \$35 per load. The Idaho mine is looking well; the 15 and 16 levels containing rich pay ore. The Idaho declared the other day its 107th dividend. The Horse-shoe is idle at present, but will resume operations as soon as the winter is over. The machinery upon this mine was inadequate to handle the water in wet weather and that was the reason the mine closed down. The North Star is now pumping and sinking. The shaft is down 1400 feet, and has a good paying ledge in the bottom. The concrete foundation for the hoisting works is about completed, and in a very short time the crown wheel and the hoisting works in general at the North Star will rest upon as firm a foundation as there is in any mine in the country. Work is still going ahead in the Green Mountain mine, the last crushing of 22 loads of rock from this mine yielding \$50 per load. Next week will determine the fate of Allison Ranch mine as far as the French syndicate is concerned.

A GOOD LEDGE.—A very rich quartz ledge has been struck in the old Osceola ravine, one and a half miles from Rough and Ready, which pays not less than \$40 per ton. The ledge is about 18 inches in thickness. The quartz is very rich and easily mined. The owners of the ledge are Henry Schroeder, Wm. Rex and James Huett. The principal owner is Wm. Rex.

A RICH STRIKE.—Grass Valley *Union*, March 6: A rich strike has recently been made in the Morning Star gravel mine on Indian canyon, opposite Iowa hill. The tunnel is in a distance of 1900 feet, from which an upraise of 40 feet was made, and a drift run along the channel 400 feet. Winzes were put down at several points, the last one giving splendid prospects of \$8 per car-load of coarse gold, in shape like melon seeds. Where this find was made is about 18 feet above the level of the main tunnel, which is to be extended to that point, and will be low enough to bottom the channel, which is now ascertained to be rich. The company feared the tunnel would prove to be too high when the channel was reached, but the drift which has been run above the tunnel level has proven that this will not be the case, and that the ground can be worked to advantage and economically. The Morning Star is an old claim, having been worked more or less for the last twenty-five years, and at one time as a hydraulic claim on the front channel, but the work done of late years has been with a view to drifting the gravel, which is the only mode practicable to work the gravel in the future. Hon. J. H. Neff, who is one of the owners in the Morning Star, has shown a reporter of the *Union* a late prospect from the claim, which was a handsome one to look at.

BOSTON MINE.—Grass Valley *Union*, March 9: The Boston Mining Company, on Wolf creek, near Boston ravine, is now sinking a shaft for a third level. The ledge in the shaft is showing of good size, and free gold and an excellent quality of sulphurets are found in nearly all the rock taken out. Everything goes to show that this is going to make a fine property, and it has the advantage of being worked cheaply, as the company has permanent free water from Wolf creek, which furnishes all the water that is needed for whatever machinery that may be put upon the mine. To pay the expense of the present dead-work of sinking the shaft, a small assessment has been levied, which is probably the only one that will be required in making further developments on the mine.

COE MINE.—The work now being done in the Coe mine is making a good showing, as the rock taken out is of excellent milling quality. The prospects are encouraging for more extensive operations and from the talk going on among the owners, there is a probability that that mine will be worked on a more extensive scale in the course of a few months, than at present.

Placer.

RICH DIRT AGAIN.—Herald, Mar. 3: We received a pleasant call from Mr. A. Breece, of Bath while he was in town last Tuesday. He informs us that in their mine, the famous Breece & Wheeler claim, they have been running for something over a hundred feet through a body of low grade gravel, such as they have encountered at times before, and such as occurs in all drift diggings. Recently, however the character of the gravel has been improving again, and on Saturday last he prospected a few pans which went as high as five dollars to the pan. This mine has yielded a vast amount of money and is to-day one of the best drift mining properties in the State. The channel is something over 60 feet wide, and on an average has proven very rich.

Plumas.

CONTRACTS LET.—Greenville *Bulletin*, Mar. 3:

Messrs. John Skinner and John Taylor have secured a contract to sink the Indian Valley shaft 75 feet; also a contract to run the Union drift 280 feet. They have 12 men employed in the shaft—three eight hour shifts—and six at work in the drift. It is expected that about six weeks will be required to complete the work. As the cage must be used by the contractors the mill will not run during the sinking of the shaft. This work is of very great importance to the proper development of the mine. We are to-day reliably informed that the Buckeye mine in Sawpit, one of the John H. Thomas properties, is in gravel; that they reached the back channel and found dirt which pays \$25 to the car. It is to be hoped that it is true. Very flattering reports are afloat concerning the Neesman ledge in Mohawk Valley. Some very rich rock is shown, and the property is said to be immensely valuable. San Francisco parties have been negotiating with the owners but the result is not known.

San Bernardino.

PROVIDENCE MOUNTAIN.—Calico *Print*, Feb. 28: Since last writing there has been considerable prospecting done around Providence mountain. There is more prospecting going on here now than at any time since the Bonanza King was discovered. Lately some rich discoveries have been made on the west side of Providence. Arrow district still improves with work. The shaft on the Mountain Pass claim on the main ledge is down 25 feet showing rich gold ores. Sam King has gone to work on the Relief claim on the same ledge. The Mexicans are working their La Prati claim and are down over 40 feet, showing rich ore in the bottom. The Golden Queen has a tunnel of about 70 feet, showing rich gold rock nearly all the way, and the owners are also sinking a shaft which is down about 20 feet, showing good mineral. R. Gorman is working the Lookout claim, getting good shipping ore. Small openings have been made on several other claims, which indicate good ledges. There is no work for miners as yet in this camp, as the owners of the various mines are all practical miners themselves and they are developing them.

MESCAL CAMP.—The parties who have bonded the Cambria mine have some ten men at work. The mine is improving with work; the winze from main tunnel is now down nearly 100 feet, with rich ore in it in the bottom.

San Diego.

THE JULIAN MINES.—Los Angeles *Herald*, March 4: Col. I. R. Dunkelberger reports the outlook very encouraging at Julian. He is driving a tunnel in the Eldorado mine, in the Banner district. The tunnel is now in 340 feet, in talc and slate. He expects to tap the vein in 34 feet more, and a contract for another 100 feet of the tunnel has just been let. The point of intersection is 239 feet below the croppings. An upraise of 90 feet will be made to connect with a 150-foot shaft down on the ledge. There is forty feet of water in the shaft. The croppings consist of rich ore chutes in granite. Two ledges are developed at a considerable depth. The ore in these chutes went \$300 per ton. The ledges have granite and slate walls. Four and a half feet per day is the rate of progress made in the tunnel. The Owens mine is being worked by James, Farrel & Co. They are down 200 feet in a shaft, and have a large body of fine ore. They expect to put up a twenty-stamp mill. John Farrel is the well-known mining capitalist from Tombstone. The old Shenandoah mine and mill is being run by Mr. Farley, of Banner. James & Fulton are running a ten-stamp mill day and night on Stonewall ore. The Bailey brothers are running a ten-stamp mill on Ready Relief ore. Cowles Brothers and Chalmers are running a five-stamp mill on Hubbard ore. Chlorides are taking out fine ore on the Hidden Treasure, Antelope and Blue.

Shasta.

WHISKEY CREEK.—Shasta *Courier*, Mar. 3: We had the pleasure not long since to visit the Gold Mountain mine, discovered by a Mr. Jackson Ferguson, of the State of Nevada, and surely it is well named, and the biggest mine I ever saw; the ledge is from 50 to 60 feet wide, and the cropping looms upon the mountain side for hundreds of feet, the ore being rich in sulphates, assaying over \$1000 in gold, and from \$4 to \$6 free gold. It seems strange that this mountain of gold-bearing rock should remain so long undiscovered. This mine is splendidly situated, being on the county road, with plenty of timber and water. The mine lies in the same range with Iron mountain and Deadwood mines. This is an old placer mining country, some of the creek being very rich. One mine called the Mad Ox quartz mine, has been worked for years and very rich, but is now abandoned, and we can only feel glad to think of this valuable discovery.

STRUCK IT.—Mr. West who was employed by James and William Campbell, some time ago has recently been prospecting in the mountains above Iron mountain, and has struck a very rich deposit of gold, and is on the eve of becoming a capitalist.

HUNTINGTON MILL.—Shasta *Co. Democrat*, March 3: Bell, Hopping & Co. are erecting their Huntington mill on the Central mine in Old Diggings. W. O. Smith, secretary of the Iron Mountain Mining Company, E. P. Figg and other stockholders of San Francisco, went up to the mine last Thursday to be present at the starting up of the ponderous machinery. B. F. Slater, who was over to Muletown Monday, informed us that a Frenchman, whose name he did not learn, struck a pocket on the mountain this side of Muletown, from which he took out \$4000 in a couple of days. Mr. Slater further says the vein is over four feet wide and shows gold all through the rock. That's the kind of a prospect to find.

THE LOCO FOCO.—We almost forgot to mention this location which we visited on our way up and where we met Fred Simonds Sr., the locator. It is situated near what is known as the Big and Little Limestone Springs on the east side of Shoemaker creek, the west end extending down to that stream. It is a big deposit of gossan ore from 50 to 200 feet in width which crops out on a very steep mountain spur. Fifteen assays have already been made from the croppings, the results ranging from \$5 up as high as \$185, the average being about \$75 to the ton. Mr. Simonds has made five locations here, which takes in several living springs and a fine body of timber.

THE SNYDER MINE.—Our reporter camped with that genial and big-hearted brace of miners, Carson and Snyder, owners of the Snyder mine situated

about 400 yards south of the Crossus. Here we found Fred Simonds Sr. and friend Rideout. J. N. Vannoy, who is doing assessment work on an adjoining claim, was there also. Carson & Snyder were hard at work running a tunnel on their vein and making from four to six feet a day easy. The tunnel, which is now in about 50 feet, is driven along the side of the vein, exposing a body of ore that averages five feet in width. When in about 40 feet further they will tap the rich pay chute a hundred feet or more beneath the upper tunnel. They have a prospect which certainly shows up handsomely, and will soon have it developed sufficiently to show its permanency and value.

THE CLIPPER CLAIM.—About a quarter of a mile farther north, and the last mine on the belt, is the Clipper, owned by Frank Davis & Co. Here we found Davis driving a tunnel on the Clipper with the assistance of two men. He is running the tunnel along the vein, leaving the ore in place, and everywhere we found rich rock showing free gold at a glance. Mr. Davis has exposed this vein in about a dozen different places and for 600 feet along the surface the rock shows free gold, which is strong evidence that the pay chute or chimney is fully that many feet in length. The mine is admirably situated and can be developed cheaply.

THE SILVER KING.—This is the name of a mine recently located by Mr. Burnett, in which the assayer, De Forest, and a Sacramento gentleman are interested. It is situated directly southwest of the Loco Foco on a stream known as Mary's Fork, and almost on an air line between the famous Blakall mine west of Squaw creek and the Loco Foco. The Silver King is a three-foot vein, and so far the ore assayed averages \$45 per ton in gold and as high as 1600 ounces in silver. As soon as Mr. De Forest gets his sampling mill running in Redding he intends to work the choicest of the ore.

SQUAW CREEK.—Shasta *Co. Democrat*, Mar. 3: Our reporter paid the above named mining camp a three days' visit last week and found the district alive with busy miners. Kennett Station is the principal connecting point with the railroad.

THE CROSSUS MINE.—Myers is getting along with the milling machinery in good shape. At the mine we found L. C. Graupner superintendent. A force of men were excavating the millsite, others were whipsawing lumber and not a few framing heavy mill timbers.

THE PECK-A-BOO MINE.—Next on the belt is the prospect owned by Fred Simonds Jr., Jack Depanger and George Crowder. They have erected a small cabin and started a tunnel on a two foot vein which prospects first-rate. Their prospect is encouraging.

OTHER MINES.—Still further north a few hundred yards are the McTimmons Bros.' and Marshall's claims. They have erected a good cabin and are diligently at work prospecting their ground.

Sierra.

RUBY.—Mountain *Messenger*, Mar. 6: The total weekly cleanups for the Ruby drift mine for February was 547½ ounces. About 40 men are employed. Width of gold lead, 150 to 200 feet. Bench of pay gravel, 15 feet above channel—westward—width unknown. Main tunnel is being run north, mainly in hard blasting bedrock, blue and gray in color with some water. Gravel of a grayish tinge and dry. Gangways extend westward. Gold mostly coarse. Two nuggets weighing 12 and 16½ ounces were found last month. About 900 carloads of pay gravel is rolled out per week, six days, day and night shifts, averaging about \$3 per carload. Gold assays over 900 fine. The bedrock and gravel in the west drift on the bench are white-colored, same as at the Eldo mountain, and through which mine extends at least 2000 feet of this rich gold lead.

BALD MOUNTAIN EXTENSION.—The total sums of the cleanups of the Bald Mountain extension drift mine, Forest city, for the month of February was 502 ounces and 14 pennyweights, \$10,400.50. The regular monthly dividend, (No. 8) was declared and paid March 1st, at Scanman's bank. The gold channel is widening, and the west rim, at last accounts, was being followed 34 degrees east of north. Swelling bedrock has seriously retarded work of late in the main tunnel. A 19-ounce nugget was found in the cleanup last week. The total yield of the Young America quartz mine, Sierra city, to date is \$70,000.

Trinity.

WEAVERVILLE.—Cor. Shasta *Courier*, Mar. 3: The hydraulic mines have already done as much work as they did all of last season, and several months of sluicing ahead yet to hear from. Our quartz mines are still holding a foremost position and yielding right along. Deadwood district is, without doubt, the boss in the State, while New River is beginning to recover from the effects of the boom of last year and will before long cope with Deadwood in the production of the "yellow truck." East Fork is doing something and will be no small affair in adding to the billion products of Trinity in the near future. Trinity and Shasta will yet occupy the top shelf as the boss mining counties of the State. We have the material and enterprise, and capital is what we want to make things hum. It is bound to come sooner or later.

Tuolumne.

NEW DEVELOPMENT IN THE KELTZ.—Union *Democrat*, March 4: Last week Mr. Louis Blanding, the mining engineer, visited the Keltz mine in Tuolumne county, on the Stanislaus river, in company with and at the request of Mr. Sharwood, of Soulsbyville. He made a close examination of the new development on the Keltz mine and took samples from every opening made along the line for test as to the character and value of the ore. He regards the discovery of the new body of pay ore in the mine, from three to five feet wide as very important, and that it greatly enhances its value, and in case the ore body holds in depth, and every indication points to this as probable in the highest degree, that the mine is one of great value, and when the tunnel reaches the pay chute, which it will do when driven about 150 feet further and the stopes are opened, that the present 10-stamp mill will require to be enlarged to 20 or 30 stamps to handle the ore coming out. The vein at the point where the ore body was found is strong and bold, perfectly defined with a good clay gouge, of regular dip and the ore of fine quality. The ore carries iron, copper, zinc and lead sulphurets in fair quantity—the percentage of sulphurets exceeding the average of most California quartz mines. He deem

the presence of the zinc and lead sulphurets specially worthy of note and indicative in this mining section of California of certain promise for the profitable future of the mine. This new development will avoid all pumping and hoisting expenses as the mine will be worked through the tunnel that leads on a level to the mill. Mr. Blanding expresses himself as highly pleased with the ingenuity and mechanical skill shown by Mr. Shawwood in all the details of the plant on the mine, and believes from his extensive experience and minute acquaintance in every mining district in California, that there are few if any its equal in these respects.

SEATTLE.—Tuolumne Independent, March 4. Mr. A. P. Johnson, at the Sell mine, is still taking it out rich. This mine has for years proved one of the best mines about Sonora. The Mornio mine, belonging to the Gross brothers, at Tuttle town, and the Margoret, owned by Jim Gillis, have been bonded to Lane & Co. Krouse & Wagner are running in the old Valparaiso tunnel on Table mountain, out of which some Chilenos took out a \$500,000 pocket and had a big fight over the divy in early days.

NEVADA.

Washoe District.

SIERRA NEVADA.—Enterprise, March 9: On the 520 level west crosscut No. 2, has been advanced 64 feet; total length, 116 feet. The formation at the face is porphyry.

CON. CALIFORNIA AND VIRGINIA.—On the 1400 level the drift running southwest from the west drift has been extended 65 feet; total length 257 feet, and timbered up to the face. On the 1050 level the northwest drift has connected with the old stopes. During the week 1103 tons and 235 pounds of ore were shipped to the Morgan mill, and 1079 tons and 795 pounds to the Eureka mill. The average value of ore milled during the week, according to assays from battery samples, was \$15.51 per ton for that crushed at the Morgan mill, and \$13.36 for that crushed at the Eureka mill.

OPHIR.—On the 300 level the west drift from the old Mexican shaft has been extended 41 feet; total length 233 feet. On the 400 level the north drift from the old Mexican shaft has been extended 36 feet; total length 252 feet. On the 700 level the joint Mexican and Union drift, running northwest from the Ophir shaft through Ophir ground, has been extended 47 feet; total length, 470 feet. This drift has entered Mexican ground.

OSBORN SHAFT.—Last Thursday connection was made with the third line of pumps 2128 feet below the surface. The pumps will hold the water at this point until the surrounding ground is drained.

GOULD AND CURRY.—On the 600 level the south drift has been cleaned out and timbered 44 feet; total distance from the main west drift, 223 feet.

MEXICAN.—On the 500 level east crosscut No. 2, running from north drift No. 2, has been extended 37 feet; total length, 179 feet.

UNION CON.—On the 500 level north drift No. 2 has been extended 37 feet; total length, 192 feet.

ARIZONA.

NOGALES.—Cor. Tombstone Epitaph, March 6: Nogales is not honeycombed with mines like Tombstone, but it is a good point for reducing ores from Mexico, and this business will soon assume large proportions. The smelter is progressing as rapidly as could be expected, and will probably be ready to commence reducing ores by April 1st. A great impetus has already been given to mining in the vicinity by the erection of a smelter in Nogales. The war against the Yaqui Indians will retard business in southern Sonora until it is terminated, when a fine country will be opened for improvement. The coal fields of this region have been sufficiently investigated to assure their early development, and they will furnish the motive power for great industrial enterprises west of the Sierra Madre.

IDAHO.

NORTH STAR.—Wood River Times, March 3: About two weeks ago an important development was made in the North Star mine, on the East Fork of Wood River, in an entirely new portion of the mine. The men at work there unexpectedly cut into an ore vein whose existence was hitherto unknown. A cross-drift run through the vein since has shown it to be fully 24 feet wide, and to contain a thickness of several inches of first-class ore, while the remainder will probably concentrate in the proportion of seven to one. This discovery having more than doubled the value of the mine, the Philadelphia Mining and Smelting Company will doubtless lose no time in perfecting arrangements to erect the 5000 foot tramway between the mine and concentrator, which they have had in contemplation, as this has now become an absolute necessity. All the dumps at the mine are jammed with ore, but none of it can be hauled at present, owing to the dangerous condition of the grade at the mine.

OWYHEE PLACER MINES.—Silver City Avalanche, March 6: The place, diggings recently discovered near Glenn's Ferry, in Owyhee county, are attracting considerable attention, and drawing thither swarms of prospectors. The only difficulty in making them pay well is to get water on them. There are thousands of acres of placer mining ground along the banks of Snake river that would pay well if water could only be brought on the ground.

MONTANA.

BUTTE.—Miner, March 3: The Montana Copper Company's series of mines are not worked on a very extensive scale at present, although considerable work is being done on them. The principal work being done is conducted on the East and West Colusa mines. At the West Colusa prospecting is the order of the day. There are several large ore bodies laid open in this mine ready for the drill and pick, but not a pound of ore will be taken out, says Superintendent Raunheim, until copper advances in price. Both of the Colusas are looking grand, the furnaces are in good trim and the entire works could be started up at a day's notice if it was required. There are sixty men at work in both mines. The Parrot never looked as well as it does at present. There are 110 men employed in and around the mine.

THE MORNING STAR.—This mine is located on

Montana street, and is owned by Messrs. W. A. Clark and Adam Faraday. It has been nearly two years since anything has been done in the mine and it is now full of water. It is 200 feet deep and has a good record as an ore producer. Yesterday the mine was leased by its owners to Messrs. Bews Bros. and Wash, Hutton. They have a fourteen months' lease of the Morning Star, and intend to immediately erect a pump in the mine and clear it of water. The late acquisition is worked on lease by Messrs. Snell, Pascoe, Job, Kodda, Eddy and Edwards who have a force of twelve men employed. On the 120-foot level of this mine a rich ledge of silver-bearing ore has been discovered, that is yielding well. The Alice mine remains about the same. All portions of the property are looking and producing well, and bid fair to continue so for a long time to come. The Moulton mine looks better to-day than it ever did before. A rich ledge was encountered last Friday in a winze that is being sunk in the bottom of the 300 foot level. This winze is now down fifty feet and is improving as depth is attained. The other parts of the mine are looking well and producing the usual quantity of ore. The mill is running in a very satisfactory manner.

THE WILD BILL.—This mine has been worked on lease by the Bews brothers and Mr. Hutton. A vast amount of work has been done by this worthy company of men while the results have been highly satisfactory to them and to the owners of the property. Last week Messrs. Bews & Co. sold their lease to Walter McKee, who it is claimed represents the Anaconda Mining Company. Star of West is worked on a lease by a large force of miners who have elected Sam Hoar as their superintendent. On the 28th of January, Messrs. Hoar & Co. commenced to sink a new surface shaft on their mine, that has now attained a depth of 100 feet. This shaft is to be sunk 400 feet. Agent Goodale who is the representative of the company owning the Star West is fully satisfied at the way the leasers are carrying on work on the property. This ore is being reduced at the California smelter. The mine is leased to Messrs. Hoar & Co. for eighteen months. Since taking the mine they have put up a new iron Ray hoisting engine and a fine new Cameron pump. There is no difficulty found in handling the water in the shafts. There are twenty-five men at work, and everything is running as smooth as oil.

MINOR NOTES.—The Self Rise mine at Burlington is worked on lease by Messrs. Stephens & Co., who are doing some hard work on the property with gratifying results. The Burlington mine worked by Messrs. Madden, Job & Co., never looked as well as it does at present. The Nettie mine, leased by Messrs. Harvey, Bastian & Co., is producing an immense quantity of ore that is being reduced at the Lexington mill. At the Lexington mine, the sinking of the main shaft is carried on energetically. The mine looks favorable. The Pacific mine looks well and is giving up its hidden treasures in a very liberal manner. The Rock Island never looked better than at present and the men at work there are correspondingly happy.

A BIG STRIKE.—Butte Traction Talk, Mar. 27: As we go to press we are informed that an important strike was to-day made in the Germania mine—the property on which the late unfortunate Oxman met his fate by being drowned. The foreman, while prospecting through the works, they having been just cleared of water, discovered traces of ore on an old stope on the 150-foot level. Proceeding to develop the same, he shortly uncovered a vein of very rich ore, about two feet in width, and containing native silver, visible to the naked eye. A sample shown us will easily assay 2000 ounces to the ton.

POOR MAN'S JOY.—James Patten is still pushing the incline, the header in pay rock. There is enough ore in sight in this mine to warrant some solid corporation in stocking and thoroughly prospecting it. In every level of the Frisbee shaft there is not less than four feet of solid quartz, averaging throughout better than 35 ozs. The present owners have enough of this world's goods to hold on and develop slowly, but it would be a red letter day for the camp if Patten, Caplice, Smith & Co. would stock up the property and push the work on a more extended scale.

NEW MEXICO.

MAGDALENA DISTRICT.—Socorro Bulletin, March 2: Col. Eaton is still working his claims and is putting a new-style concentrator in his plant. Eaton & Wanless are working their extension of the Grand Tower, and shipping mineral. The Brittenstein M. & M. Co.'s plant is steadily turning out amalgam and concentrates, and the group owned by this company still affords regular supplies of pay dirt. The Kelly mine, is shipping continuous supplies of mineral. The Juanita tunnel continues to enter the flank of the mountain, and a few feet only remain before the shaft and tunnel connect, so as to ventilate the mine. Comanche Jack shipped nine tons of his gold ore to the Billing smelter two weeks ago. We are informed that it netted him and his two partners \$75 in gold per ton.

MISCELLANEOUS.—The late work on the Comet has decided it to be a very valuable silver property. Tom Farley & Co. sent six men to San Acasio to work the Tom Farley, the Old Boy and the Tenderfoot mines. Wm. Whitacre of the Ladrona district is in the city. He reports the Florence and Monitor working and looking way up. Donald McRae is blasting and sacking high grade chloride of silver ore out of his Lawrence mine.

THE KINGSTON MINES.—A rich strike of ruby silver is reported from the north Percha camp. Judge Wm. Burns has sold the Galileo mine to Socorro parties for \$8000 cash, and also bonded to the same parties two other properties for a large amount. Wm. Boyle bonded an interest in the Keystone not long since for \$2000 and was offered \$10,000 this week for his bond. Forty thousand dollars has been offered for the Keystone.

OREGON.

PROSPECTING.—Baker City Democrat, March 3: Prospectors are tramping over the hills southwest of town, and, in fact, on all other hills where the snow has disappeared. We know of one discovery made already this spring, and there will be dozens of others made before long. There are a number of prospectors awaiting the opening of the season on Pine Creek, and in the meantime they improve their time

by looking for mineral in this vicinity. Another discovery similar to the Virtue would be a fine thing for Baker and who knows but what it may be made. George Cooper and two other miners are now engaged in the tunnel claim of Cooper & Dale, near the Virtue mine. It is proposed to run the tunnel in about 500 feet to strike the extension of the Virtue. The tunnel is in about 400 feet at present, and they expect to have it completed by the 1st of May. For the first 100 feet Cooper, who was working alone made rapid progress, but since that time they have been working in rock. Several parties have attempted this work before, not realizing the immensity of the undertaking, and the most persevering heretofore failed to run in 100 feet. The parties now engaged in the enterprise have shown commendable pluck and energy and we hope to see them rewarded as they deserve.

UTAH.

REVIEW.—Salt Lake Tribune, March 5: The receipts in this city for the week ending March 3d, inclusive, were: Bullion, \$104,377.74; ore, \$72,762.68; total, \$177,140.42. For the previous week the receipts were \$196,579.69, of which \$131,052.30 was ore and \$65,527.39 was bullion. The Ontario bullion output for two months is as follows:

January	111,792.37 fine oz.
February	118,088.19 fine oz.

Total	229,880.56 fine oz.
Its ore sales were—	
January	\$60,872.33
February	61,054.19

Total	\$121,926.52
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Being a total product for the two months, reckoning silver at \$1.02, of \$356,404.70. The Daly, along the Ontario vein, is now in first-class productive condition. Its ore sales for two months were as follows:

January	\$28,455.20
February	31,662.06

Total	\$60,117.26
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It will, from henceforth, report bullion from its Marsac mill at Park City, which is operated by the Daly company in reducing the ores of that great mining property. The mill is working most satisfactorily. It is a complete 30-stamp silver mill combining the most modern machinery and appliances. It has been gradually working up in capacity ever since being started last month, and has now reached the grand result of 53 tons of ore per day being crushed and discharged through the thirty-mesh screens. The mill employs fifty-four men to operate it successfully. That the reader may better understand the good results achieved, we give the workings of the Ontario mill, which has always been considered one of the best in the country. The Ontario has forty stamps, operates ninety men and crushes on an average seventy tons of ore per day, discharging the pulp through the same sized screens as the Marsac. This makes 3533 pounds per day for each stamp in the Marsac mill, while in the Ontario it is 3500 pounds per stamp. The batteries in the Marsac being new, are in better condition for doing fast work than the Ontario. The Daly ore worked in the Marsac is harder than the Ontario ore, and in both mills the same sized screens are used. The question of size of screens is an important one, hence the experience of Mr. Chambers in this respect will interest our readers. At first the Ontario mill used screens forty meshes to the inch, and afterwards made various experiments in screens ranging from forty down to twenty-eight meshes. Careful tests were made in results of chlorination and records kept of the amount of ore pulped per day. It was found that chlorination was just as good with a thirty-mesh screen as with a forty, and that with the former the mill pulped ten tons more ore per day than when the fine screens were used. This change of screen virtually increased the capacity of the mill 15 per cent without adding to the cost of operating. When the forty mesh was used, the pulp was held in the batteries until much of it was reduced so it would pass through a sixty-mesh sieve. It is by close attention to details, the providing of the best machinery and adaptation of the best processes that the Ontario has been made such a great property and enabled the company to pay its millions in dividends. The base bullion receipts of the week aggregated \$13,320. The bullion product of the Hannaer smelter for the week was \$22,740; of the Germania eight bars, \$20,613.51. The Siomont sent up three bars from Silver Reef, \$5330. One gold bar was received on the 26th from the Kentuck G. and S. M. Co., \$11,350.

PARK NOTES.—Record, March 9: A new tailing dam is being constructed by the Marsac mill immediately back of Fennemore's store, and barns and other outbuildings that have been built on that property are being removed by a force of company employees. The Anchor shaft is down to a depth of between 300 and 400 feet. Two pumps keep the shaft clear of water at this depth and the probabilities are that no more will be required, as the ground is undoubtedly drained by the Daly and Ontario mine, it being, as is supposed, on the same ledge, Mr. Chas. Barnycott and a party whose name we did not ascertain, are prospecting below town on the hill near the Empire mill site and feel much encouraged with the showing they have got. They have run a tunnel 200 feet for this winter. A force of men are at work at the concentrator removing the machinery from it and grading preparatory to the proposed enlargement. As soon as lumber and other necessary building material comes to hand, a force of carpenters will be put to work and everything will be pushed to completion, so that work may be begun on the concentrates as soon as the tramway is clear of snow. A visit to the Creole mine, owned by D. A. Condo, showed that Dave and a party who is leasing part of the property were doing their level best to keep this mine among the ore producers of the camp and a look at the ore dump and the ore in sacks showed that their efforts were not in vain. The Creole will certainly make a good paying mine, and every bit of work that is being done on it, goes to demonstrate this fact.

THE STORMONT.—An average of thirty-eight tons of ore, per day, was bailed from the mines to the mill last week. The main incline in the Savage & Buckeye, is down 144 feet below the 600-foot level. A cross-cut will be started for the hanging-wall this week.

List of U. S. Patents for Pacific Coast Inventors.

From the official report at U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING MARCH 2, 1886.

337,887.—FIRE ESCAPE—Jos. Ben, S. F.
337,122.—ORF CONCENTRATOR—F. H. Blake, Pinal, A. T.
336,697.—ELECTRICAL BRUSH—Jas. D. Culp, San Felipe, Cal.
336,898.—ELECTRICAL TORCH FOR LIGHTING GAS—James D. Culp, San Felipe, Cal.
337,136.—WASHING MACHINE—E. W. Dixon, Yakima, W. T.
337,220.—MUSICAL KEY INDICATOR—O. H. Goodwin, S. F.
337,272.—POLARIZED TELEGRAPHIC RELAY—J. C. Ludwig, S. F.
337,018.—TREE FELLER—W. G. Rendall, Portland, Or.
336,946.—PLOW—T. Reyner, Lathrop, Cal.
337,025.—UT-OFF VALVE—John P. Simmons, S. F.
337,029.—DRUM ATTACHMENT FOR PIN RAILS—A. F. Spear, S. F.
337,036.—CLINCHING PUNCH—John R. Watson, Sacramento.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect accuracy, at reasonable rates, and in the shortest possible time.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco:

BLACKLOCK SANDSTONE CO. March 7.—Object, quarrying sandstone in Curry county, Or. Capital stock, \$100,000 in 10,000 shares. Directors, John Blacklock, W. H. Martin, Herman Shainwald, C. G. Kenyon and R. L. Shainwald.

CALIFORNIA HISTORICAL SOCIETY, March 7.—Object, to collect historical information. Directors, Wm. Ashburner, Horace Davis, Joseph A. Donahue, John T. Doyle, Edward S. Holden, Ralph C. Harrison, John R. Jarboe, Bernard Moses, J. De Barth Shorb, Wm. Norris and A. Varsi.

TULARE LAKE AND KING'S RIVER CANAL CO. March 7.—Object, constructing canals and ditches to take water from Tulare lake and King's river and convey the same to the tillah lands in Fresno, Tulare, Merced and Stanislaus counties. Capital stock, \$600,000, in 600,000 shares. Directors, E. Fair, H. C. Willson, B. P. Jenkins, W. L. Richardson and Wm. Shrader.

Mining Share Market.

No special activity is displayed in the mining share market. There is less business done in stocks in a month now than there was in a day, eight or ten years ago. On the Comstock, however, they are working harder than ever to make some development which shall again make affairs lively there. On the first of this month the following companies had each on hand: Best and Belcher, \$34,402.08; Alpha Consolidated, \$2,256.47; Chollar, \$10,727.47; Exchange, \$5,678.02; Gould and Curry, \$4,514.57; Occidental, \$1,832.27; Utah, \$6,436.34; Sierra Nevada, \$13,403.36.

The following companies had indebtedness: Con. California-Virginia (overdraft), \$63,387.33; Hale and Norcross, \$1,222.58; Potosi, \$10,679.38; Mexican, \$490.85; Ophir, \$861.42. To offset the indebtedness shown by the Con. California-Virginia, the company has \$58,929.54 assay value of unsold bullion on hand, and several more bullion shipments to be received to complete the February account, and the expenses of the mine for that month are partly paid.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

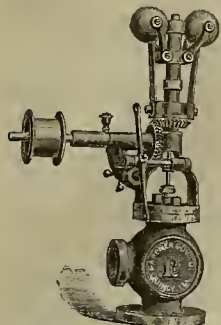
Lexington, March 2, \$45,644; Hannaer, 3, \$8450; Germania, 3, \$2081; Kentuck, 3, \$11,350; Stormont, 4, \$1970; Germania, 4, \$4205; Hannaer, 5, \$3740; Germania, 5, \$2049; Hannaer, 6, \$3,400; Germania, 6, \$4527; Alice, 7, \$14,661; Hannaer, 7, \$6840; Germania, 7, \$2193. Last week Wells, Fargo & Co., at Salt Lake, received in bullion \$57,010; McCormick & Co., \$59,840; T. R. Jones & Co., \$37,266, and Union National Bank, \$30,025.

Meetings and Elections.

ANDES S. M. CO., March 9.—Directors, W. E. Sell, Joseph Marks, J. T. Bridge, A. K. P. Harmon and A. W. Rose.

HALE & NORCROSS M. CO., March 9.—Directors, H. M. Levy, E. B. Holmes, Morris Hoefflich, Jacob Greenebaum, L. P. Drexler, George W. Grayson and A. Borland.

The Idaho Statesman says: The Cœur d'Alene papers anticipate a big boom in mining operations in that section this year. The mines that were worked paid handsomely last year, and the general opinion among mining men is that the Cœur d'Alene will open up into the biggest mining camp in Idaho. May their anticipations be realized.



Gardner Spring Governor.

TATUM & BOWEN,

25 to 31 MAIN STREET, SAN FRANCISCO, CAL.

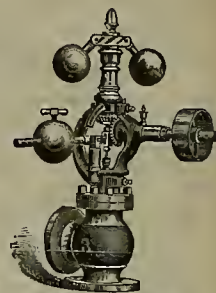
91 to 93 FRONT STREET, PORTLAND, OR.

SOLE AGENTS FOR

GARDNER GOVERNOR COMPANY,

J. S. Mundy's Patent Friction Hoisting Engines.

The Mundy Patent has been sustained in the United States District Court of New York against the Ledgerwood Manufacturing Company, and also in the District Court in the State of New Jersey against Kendall & Roberts for infringement. Therefore all parties are cautioned against making, using, or selling Friction Drums that infringe this patent.



Gardner Governor.

GORDON & MAXWELL COMP'Y MINING PUMPS.

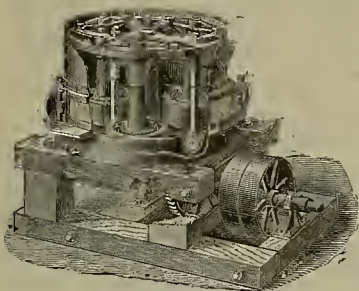
THE MOST EXTENSIVE PUMPING MACHINE WORKS IN THE UNITED STATES.

MORRIS COUNTY MACHINE and IRON CO. New High-Speed AIR COMPRESSOR.

We have recently furnished the contractors the machinery for La Trinidad (300 tons per day) and Silver Queen (100 tons per day). These mines are located in Mexico and belong to La Trinidad Company, of London. The Process is the Wet Concentration, and the Plants are, without doubt, the most substantial and complete of the kind ever built.

WE MANUFACTURE ENGINES, BOILERS, AND SAW-MILL MACHINERY, and Carry in Stock:

Wood and Iron Working Machinery, Best Belting, Lubricants for Cylinders and General Machinery, Including the Celebrated ALBANY LUBRICATING COMPOUND.



Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON,

MANUFACTURER OF

Centrifugal Roller Quartz Mills,

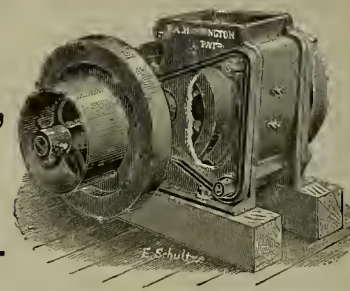
CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

Steam Engines and Shingle Machines.

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Get our Prices before ordering elsewhere. Samples furnished on application.

SAN FRANCISCO NOVELTY AND PLATING COMPANY, No. 21 Stevenson Street.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 & 523 Market St., San Francisco.

NOTICE TO MILL MEN.—All our plates are guaranteed to have the Full Weight of Silver agreed upon, and are all tested before leaving our Works, thereby avoiding the complaints about light-weight, made so often formerly before our starting in this branch of business. PLATES CAN BE FURNISHED AT ANY PRICE REQUIRED.

JAS. LEFFEL'S TURBINE WATER WHEEL "The Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

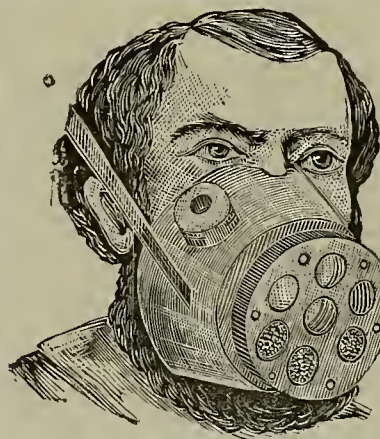
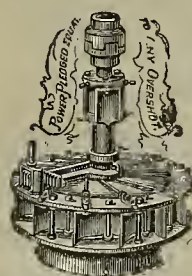
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PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

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VULCAN BB AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN BB POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

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THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

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STURTEVANT MILL.

This Mill as a Crusher and Pulverizer is without rival. Is in operation in leading smelting works and mills.

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MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

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MACHINERY,

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SELBY
SMELTING and LEAD CO.,

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GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

C. H. AARON,
ASSAYER AND METALLURGIST,
NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

THOMAS PRICE,
Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
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WM. D. JOHNSTON,
ASSAYER AND ANALYTICAL CHEMIST.
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ASSAYING TAUGHT.

Personal attention insures Correct Returns.

JOHN TAYLOR & CO.,
IMPORTERS AND DEALERS IN
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MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUGGISTS' GLASSWARE AND SUNDRIES, ETC.

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We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals. Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application. Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869.

Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the most suitable Process for Working Ores.
Special attention paid to Examinations of Mines; Plans and Reports furnished.

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Ores Sampled and Assayed, and Tests made by my Process.
Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.
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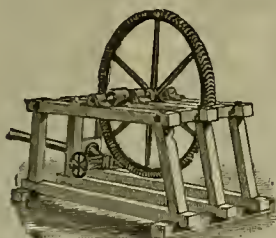
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L. PETERSON, MODEL MAKER,
258 Market St., N. E. cor. Front (upstairs), San Francisco.
Experimental machinery and all kinds of metal, tin, and Brasswork.

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KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.
SEND FOR CIRCULAR.

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MACHINE TOOLS,
PRESSES AND DIES,
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MACHINERY.

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Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

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Gear Cutting a Specialty.

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All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for

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Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.

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To furnish SILK REELING MACHINES of the most modern and best patterns

Proposals and correspondence to be accompanied with drawings or photographs of machines; also price. Address proposals to the STATE BOARD OF SILK CULTURE, 21 Montgomery avenue, San Francisco, Cal.

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Payne's Vertical and Horizontal Engines.
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Disston's Circular Saws.
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ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.



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221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Churns, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).
Orders Promptly Executed

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS. ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'T.	SALR.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co.....	Nevada.....	2.	50.	Mar 4.	Apr 8.	Apr 23.	W. Willis.....	309 Montgomery St
Andes S M Co.....	Nevada.....	28.	25.	Feb 16.	Mar 25.	Apr 12.	B. Burris.....	309 Montgomery St
Alta S M Co.....	Nevada.....	33.	25.	Feb 1.	Mar 5.	Mar 25.	W. H. Watson.....	302 Montgomery St
Benton Con M Co.....	Nevada.....	15.	10.	Feb 4.	Mar 11.	Mar 30.	W. H. Watson.....	302 Montgomery St
Buchanan M Co.....	California.....	15.	25.	Feb 9.	Mar 17.	Apr 7.	T. J. Sullivan.....	121 Post St
Cos Pacific M Co.....	California.....	8.	15.	Feb 18.	Mar 22.	Apr 15.	F. E. Luty.....	330 Pine St
Forty-nine M Co.....	California.....	1.	10.	Feb 4.	Mar 15.	Apr 5.	A. L. Perkins.....	310 Pine St
Good Improvement Co.....	California.....	1.	10.	Feb 8.	Mar 23.	Apr 19.	R. N. Van Brunt.....	318 Pine St
Johnson M Co.....	California.....	3.	02.	Feb 3.	Mar 8.	Apr 6.	G. W. White.....	318 Montgomery St
Lady Washington Con M Co.....	Nevada.....	5.	05.	Feb 4.	Mar 9.	Mar 29.	W. H. Watson.....	302 Montgomery St
Mexican M Co.....	Nevada.....	31.	25.	Feb 9.	Mar 15.	Apr 8.	C. E. Elliott.....	309 Montgomery St
North Belle Isle M Co.....	Nevada.....	10.	20.	Mar 2.	Apr 8.	Apr 5.	J. W. Pew.....	310 Pine St
Potosi M Co.....	Nevada.....	22.	30.	Feb 4.	Mar 9.	Mar 31.	C. E. Elliott.....	309 Montgomery St
Peelers M Co.....	Arizona.....	7.	25.	Mar 3.	Apr 5.	Apr 27.	A. Waterman.....	339 Montgomery St
MEETINGS TO BE HELD.								

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Chollar M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	Annual.	Mar 17
Idaho M & M Co.	California.	B. F. Dahl.	331 Montgomery St.	Annual.	Mar 20
Jackson M Co.	California.	D. C. Bates.	309 Montgomery St.	Annual.	Mar 22
Kentuck M Co.	Nevada.	J. W. Pew.	310 Pine St.	Special.	Mar 15
Mayflower Gravel M Co.	California.	Morizio.	328 Montgomery St.	Annual.	Apr 1
Melones Con M Co.	California.	R. R. Grayson.	327 Pine St.	Annual.	Mar 23
Virginia Con M Co.	Nevada.	A. F. Bernard.	861 Howard St.	Annual.	Mar 16

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Calcedons M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Feb 23
Con Virginia & California M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	30.	Feb 12
Derbec Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Feb 9
Holmes M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Mar 20
Jackson M Co.	California.	D. C. Bates.	309 Montgomery St.	10.	Mar 5
Mono M Co.	California.	G. W. Sessions.	359 Montgomery St.	25.	Mar 10
Manhattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Mar 17
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar 15
Syndicate M Co.	Nevada.	J. Stadler Jr.	419 California St.	10.	Dec. 25

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 18.	WEEK ENDING Feb. 25.	WEEK ENDING Mar 4.	WEEK ENDING Mar 11.
Alpha.	.30	.25	.40	.35
Alta.	.10	.10	.10	.10
Andes.	.10	.15	.10	.15
Argenta.	.08	.08	.10	.08
Belcher.	1.10	1.05	1.10	.90
Belding.	.10	.10	.10	.10
Best & Belcher.	1.30	1.35	1.31	1.45
Bullion.	.25	.35	.40	.50
Bonanza King.	.10	.10	.10	.10
Bodie.	1.10	1.25	1.45	1.70
Benton.	.10	.10	.10	.10
Bodie Tunnel.	.10	.10	.10	.10
Bulwer.	.45	.60	.70	.65
California.	2.45	2.25	2.40	2.30
Challenge.	.10	.15	.20	.15
Champion.	.80	.95	.85	.90
Chollar.	.80	.95	.85	.90
Confidence.	.90	.95	1.25	1.40
Con. Imperial.	.20	.25	.25	.25
Con. Virginia.	2.05	2.45	2.25	2.40
Con. Pacific.	.10	.15	.20	.25
Crown Point.	1.05	1.15	1.10	1.20
Day.	.15	.15	.15	.15
Eureka Con.	1.25	1.65	1.85	2.70
Eureka Tunnel.	.10	.10	.10	.10
Exchequer.	.10	.20	.20	.25
Grand Prize.	.70	.75	.80	1.05
Gould & Curry.	.70	.75	.80	1.05
Goodshaw.	2.10	2.30	2.20	2.30
Hale & Norcross.	.11	.12	.12	.10
Holmes.	.10	.10	.10	.10
Independence.	.10	.10	.10	.10
Julia.	.10	.10	.10	.10
Justice.	.10	.10	.10	.10
Martin White.	.10	.10	.10	.10
Mono.	3.00	3.90	3.80	4.20
Mexican.	.25	.35	.40	.40
Mt. Diablo.	.75	3.50	3.50	3.50
Northern Belle.	.35	.40	.35	.40
Navajo.	.35	.40	.35	.40
North Belle Isle.	.10	.10	.10	.10
Occidental.	.75	.80	.80	.80
Ophir.	.40	.50	.45	.50
Overman.	.15	.20	.30	.35
Potosi.	.20	.25	.35	.50
Pinal Con.	.10	1.20	1.15	1.50
Savage.	.10	1.20	1.15	1.50
Sierra Nevada.	.65	.75	.65	.85
Silver Hill.	.05	.10	.10	.15
Silver King.	6.00	.05	.10	4.75
Sycamore.	.05	.10	.10	.15
Syndicate.	.15	.15	.15	.10
Tioga.	.50	.55	.50	.60
Union Con.	.50	.55	.50	.60
Uta.	.50	.55	.50	.60
Yellow Jacket.	.95	1.00	.95	1.05

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Mar. 11.	300	Hale & Norcross.	1.55
150 Alta.	300	Mexican.	.40c
250 B. & Belcher.	1.50	300 Mono.	.30
150 Bodie Con.	1.50	150 Nevada.	.25c
100 Bullion.	.40c	450 Ophir.	.95c
200 Obollar.	1.15	100 Potosi.	.75c
10 Crown Point.	1.05	250 Savage.	1.15
175 Con Va & Cal.	2.25	150 Sierra Nevada.	.70c
30 Confidence.	1.25	90 Silver King.	6.50
200 Con. Pacific.	1.55	100 Union Con.	.55c
100 Gould & Curry.	.90c	25 Yellow Jacket.	.90c

For Mining Share Market, Bullion Shipments, etc., see page 181.

PEBBLE SPECTACLES sold at greatly reduced prices. Muller's, 135 Montgomery St. x

DIVIDEND NOTICE.

OFFICE OF
The Paradise Valley Mining Company.
San Francisco, California.

At a meeting of the Board of Directors of the above named Company, held February 24th, Dividend No. 6, of Ten Cents (10c) per share was declared, payable on SATURDAY, the 27th day of February, at the office of the Company. Transfer book will close on Thursday, February 25th, at 12 o'clock m.

W. LETIS OLIVER, Secretary.

OFFICE—No. 328 Montgomery St., San Francisco, Cal.

American Exchange Hotel,
SANSOME STREET.

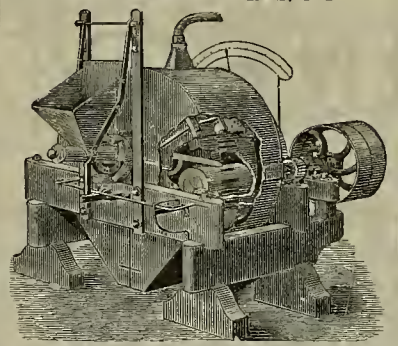
Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

Goodyear's "Gold Seal" Rubber Hose.
FOR SALE BY ALL DEALERS.GOODYEAR RUBBER COMPANY.
R. H. PEASE, JR., } AGENTS.
S. M. RUNYON, }
577 and 579 Market St., San Francisco.Tustin's Pulverizer
WORKS ORE WET OR DRY
FULTON IRON WORKS, S. F.MANUFACTURED BY
HINCKLY, SPIERS & HAYES,W. E. CHAMBERLAIN, JR. T. A. ROBINSON.
PACIFIC Business College,
320 POST ST.
SAN FRANCISCO.

Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.
Ladies admitted into all departments. Day and Evening Sessions during the entire year.
Call, or send for CIRCULAR to
CHAMBERLAIN & ROBINSON, Prop's.**PACIFIC ELECTRIC PAD**
THE GREATEST DISCOVERY OF THE AGE!
Patented Jan. 10, 1882.
Best Retainer in Existence!Gives perfect ease and comfort in all positions. Does not interfere with work or business. We guarantee a perfect cure in all cases which we accept and treat, both of adults and children. Now, reader, if you are afflicted with this, or any other ailment, we especially desire all extreme cases, those difficult to retain and those considered incurable. If other treatment has failed you, come and see us. EVIDENCE UNLIMITED!
Our Terms: NO CURE, NO PAY.
CURES RUPTURE IN FROM 50 TO 90 DAYS.
Single Truss with solution, \$20. Double Truss, \$40.
Consultation and Advice Free. Write for full information and circulars. Office 320 Post St., San Francisco, Cal.**PACIFIC ELECTRIC CO.**
SOLE PROPRIETORS,
No. 330 Sutter Street, San Francisco, Cal.**HEALD'S BUSINESS COLLEGE,**
24 Post St. S. F.
Send for Circular.

Only "PEBBLE" Establishment.

MULLER'S OPTICAL DEPOT,
135 Montgomery St., near Bush.

Specialty for 37 Years!

The most complicated cases of defective vision thoroughly diagnosed, free of charge. Orders by mail or express promptly attended to.
Compound Astigmatic Lenses Mounted to Order. Two Hours' Notice.

A Good Opportunity for a Mechanic.

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic.

Address A. B. C., care of this paper.

THE NEW CIRCULAR STAMP BATTERY.

Quartz men for years have endeavored to find a substitute which would combine the simplicity and efficiency of the ordinary straight battery and do away with the clumsy and expensive frame work. Many new machines have been brought forward, but have proved inadequate, and quartz men generally have determined that stamps are still to be accepted as the most economical and effective. In view of this fact I have closely applied myself for years to overcome the objectionable feature of the straight battery, notably, the cumbersome work, which is always more expensive than the iron-work, and yet retain the stamps. In this I have succeeded and know the battery now presented will meet the approval of all practical mill men. The points gained are as follows:

- 1st. It is in every detail as to feed, tappets, stems, shoes, dies and boxes, the same as the ordinary battery. It is simply a straight battery thrown into a circle and so constructed that the iron work is self-supporting, doing away with all the old work, and the structure rests upon its foundation more firmly than a wooden battery possibly can.
- 2d. The application of power is nearer the base than in any ordinary battery consequently there is less leverage and less vibration.
- 3d. The foundation for battery will not cost ordinarily over \$75.00.
- 4th. A 12-stamp mill will not require a larger building than an ordinary 5-stamp straight battery. Hence a great saving in lumber and labor.
- 5th. More quartz can be crushed for power expended than by a straight battery, as there are no "end stamps" to impede work, and the discharge surface is much greater.
- 6th. It is a good amalgamator on account of the circular motion given to the ore during reduction, as 85% to 90% of the metal is retained inside of the battery.
- 7th. Foundation and power being ready, the mill can be erected and running in three days after it is delivered on the ground, thus saving in working time enough to pay the cost of a mill.

ALMARIN B. PAUL.

These mills are built with 8, 12 or 20 stamps in one mortar, and when ready for work, will cost a great deal less than an ordinary straight battery.
Parties desiring Stamp Batteries, will do well to investigate this mill, which can be seen at the Works on a large practical scale, and by model at the office. They will be sold on favorable terms.
For particulars apply to

CALIFORNIA QUARTZ MILLING COMPANY.

ALMARIN B. PAUL, General Manager.

Room 20, Safe Deposit Building, San Francisco, Cal.

JOHN LOFTUS.

MANUFACTURERS OF

Nevada Lubricating
Compounds.

Quartz Mill Screens a Specialty

WORKS:

111 and 113 South C St., Virginia, Nev.

E. C. LOFTUS.

OBA. RICH.

AGENTS PACIFIC COAST FOR

LARKIN & SCHEFFER, of St. Louis.

ANHYDROUS
LIQUID AMMONIA.

We guarantee the above the Best Ammonia in the market.

LOFTUS BROTHERS & RICH,

Sole Agents for CALIFORNIA, NEVADA and ARIZONA, for

BINGHAMTON, CYLINDER AND MACHINE OILS.

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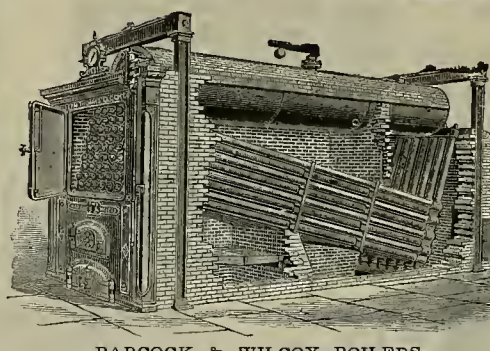
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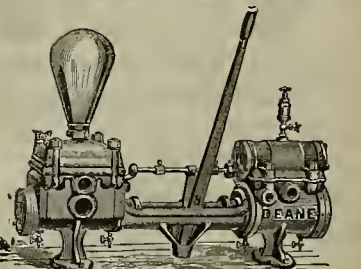
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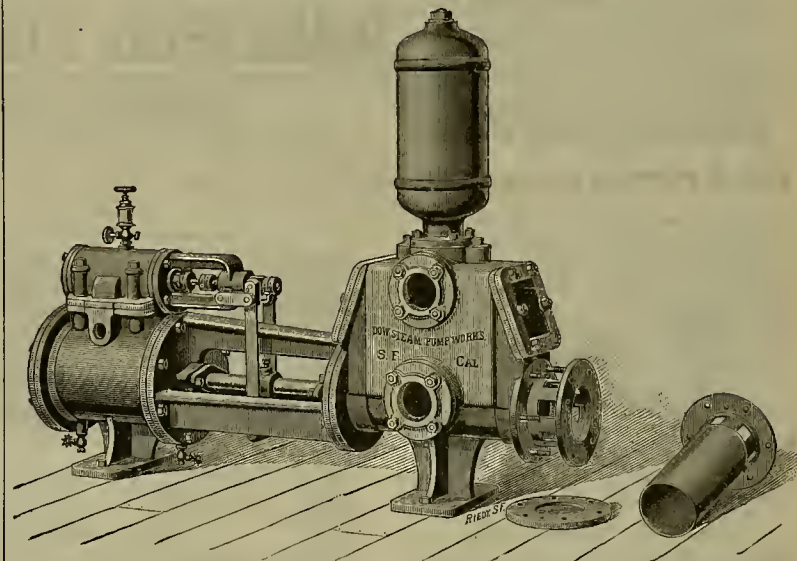
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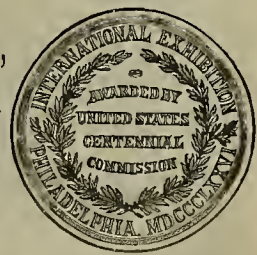
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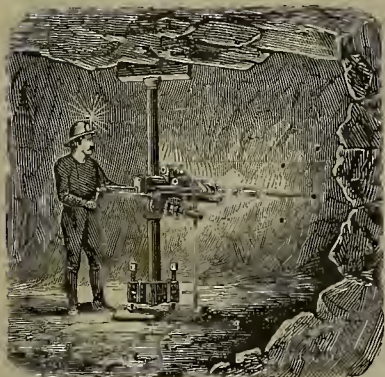
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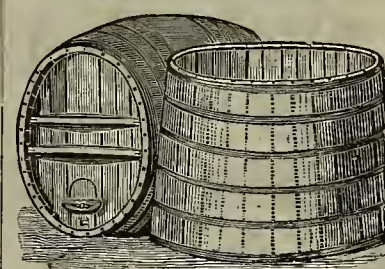


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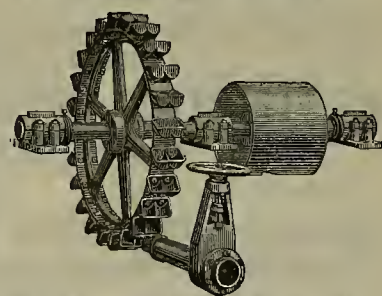
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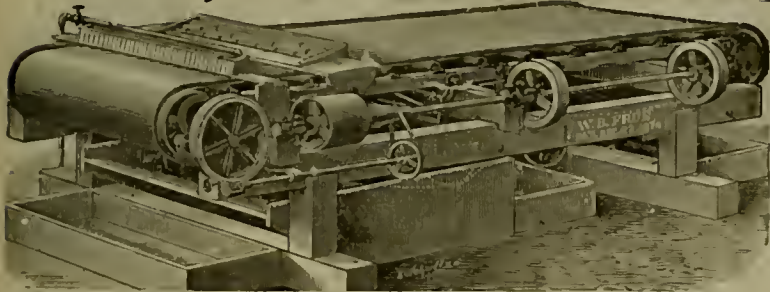
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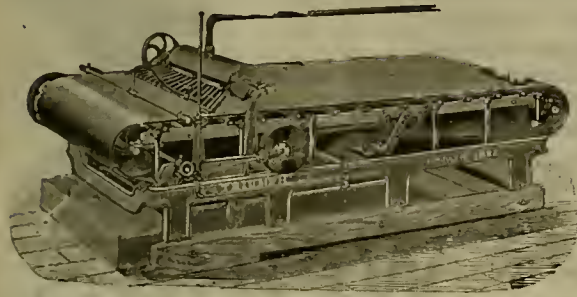
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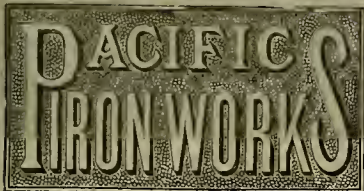
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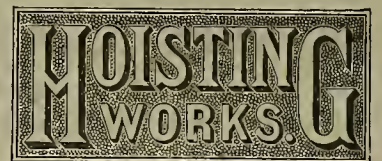
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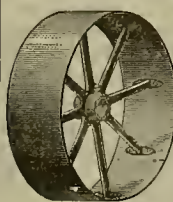
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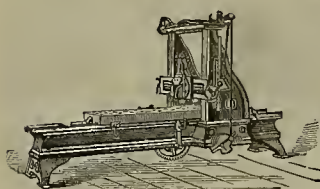
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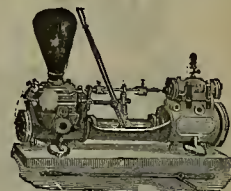
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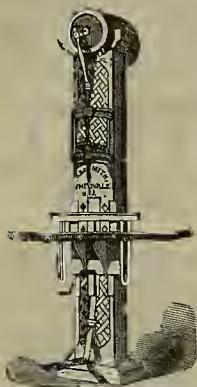
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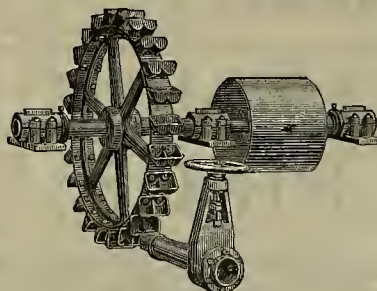
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complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating
looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, MARCH 20, 1886.

VOLUME LII
Number 12.

The Canadian Pacific Railroad.

The Canadian Pacific Railroad is finished—that is as far as grading and track laying is concerned—ons terminus being Halifax and the other Victoria, but the difficulties are by no means over. Even when the officials went to see the last spike driven, they were delayed several days by slides, and it is probable they will have great trouble from that source for a long time to come. In conversation with Mr. G. H. Behm, who has been connected with the construction of the road, we learn some interesting facts concerning the road. It is his opinion and that of many others familiar with it, that they will always have difficulty in keeping the road open in winter on account of the very heavy snows and the danger of slides. The road runs through sections of country where they really do not know what the winters are. For hundreds of miles there are no settlers and even no Indians. Great agricultural possibilities are expected all along the line and immigrants are to be induced to settle, but those who have been along the road do not greatly encourage the idea.

Near Victoria, at the western end, the country is good, but in the Rockies it is very bad, and the engineers had great trouble. In many places the men had to be lowered with ropes to cut out the plans for the road bed. Our informant thinks it doubtful if the road can ever operate continuously in the winter. In some places there was 25 feet of old snow when the new snow came. The heavy winter winds also cause trouble from the drifting of the snows.

In some places along this road after the track was laid along the sides of the canyons it was completely covered, so that it had to be abandoned and tunnels run. It is probable that many more tunnels will also have to be made. Even if the trains run regularly, those familiar with the country consider it doubtful if the road will ever pay. As far as the country through which it runs is concerned it will furnish very little freight and few passengers. No snowsheds have so far been built in the mountains. In some places there is a five per cent grade. In ascending the mountains they have a loop in the circle of a mile at the summit of the Rockies. In descending they cross a ravine on a bridge which is 295 feet high.

Between Winnipeg and the Rockies there is some farming done, but a good deal of the region is alkaline and of little use. It is said, however, that the track runs through the worst part of the country and 30 miles back there is good farming land. The prairies are low and level and filled with ponds and lakes, which in summer dry up. This character of land extends over 1000 miles or more.

A great deal of work still remains to be done on the track in the matter of grading, leveling and ballasting. It is not straightened and put in good order yet. They are not now running through trains. Mr. Behm does not see how the Canadian Pacific is going to do much damage to California interests in any way.

A few colors of gold have been found in the mountains along the line of the road, though little prospecting has been done. Old mining men who saw the ground did not get excited over it. Still it is probable that in spring some little "boom" may be arranged, mainly in the interests of the railroad.

SLUCE robbers have been operating at drift mines in Nevada county.

A Big Mining Shaft.

Among the numerous objects of interest in Mexico, there is none so well worthy of a visit as the shaft of "Valenciana," near Guanajuato. From the Plaza Grande, in Guanajuato, this shaft is distant about three kilometers in a northeasterly direction.

The shaft was commenced by the Count of Valenciana in the beginning of this century. The property subsequently fell into the hands of an English company, but was abandoned by them on account of the influx of water, which they were unable to handle.

After lying idle for over 40 years, the prop-

erty, a few years since, came under the management of the distinguished mining engineer, Francisco Glennie, through whose energy and ability the mine has been unwatered, and the shaft is once more the means of communication with the ore bodies of the mine.

We are indebted to E. C. Van Blarcom, who visited the mine not long since, for a descrip-

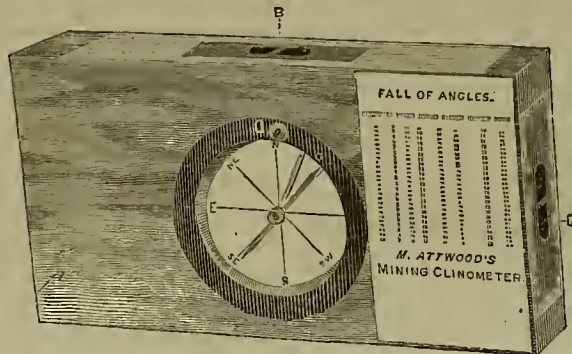
tion of the shaft. The shaft is octagonal in shape; it is 10 meters (32.8 feet) in diameter, in the clear, and is 530 meters (1738.77 feet) in depth. Formerly the hoisting was done by means of eight *malacates*, or horse whims, one running against each face of the octagon. The *malacates* have been replaced by four steam hoists. Three of the hoists are 22-horse power each, with single reel; the fourth, built in the United States, is a 50-horse-power double engine, with cylinders 356 millimeters (13.99 inches) long, and 609 millimeters (23.93 inches) stroke, spur geared and fitted with two reels for round wire rope; it is arranged to under and over wind. The cages and tanks run on guides of one-inch wire rope. The different engines are used indiscriminately for hoisting purposes.

The water is raised in a sheet-iron tank, which is reinforced with wrought-iron bands. The tank is arranged to fill and discharge automatically; these tanks have a capacity of 2300 kilogrammes (5070.8 pounds, or about 600 gallons) each; 1800 tanks or 4,140,000 kilos (say 1,080,000 gallons) of water are hoisted per day of 24 hours.

The amount of ore extracted varies so greatly that the daily output cannot be given.

A New Clinometer.

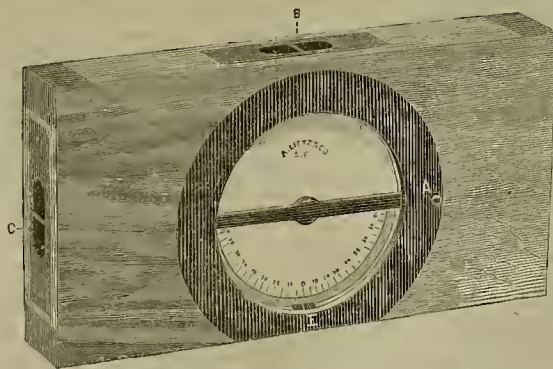
The accompanying cut is about half size and represents a new clinometer, designed by Mel-



ATTWOOD'S CLINOMETER. SHOWING COMPASS.

ville Attwood for the use of the miner and prospector. It can easily be carried in the pocket, and is made as small as possible consistent with accuracy.

E, is the graduated circle which is kept in place by a small spring at *A*, a slight pressure on the knob of which sets the circle free, and on the removal of the fingers the instrument



CIRCLE OF ATTWOOD'S CLINOMETER.

can be taken up and the angle of inclination easily read. *D* represents a compass for taking approximate bearings. *B* and *C* are small levels, one on the top and the other at the end of the instrument. With this clinometer and a small straight-edge the underlay of any metalliferous vein may be accurately taken, and in positions where a larger instrument could not be used; also the dip of any bed, or stratum of rock or seam of coal.

The timbering of any level, shaft or incline may be set by it. It can be used in quartz mills to give the proper angle to the silvered plates, blanket, trays and sluice boxes. The instrument is a very practical one, and is made in this city.

The Lick Observatory.

The finishing touches on the crown glass disk for the 36-inch objective at the Lick Observatory are now being given, the work being necessarily done by hand. The venerable Alvin Clark and his son are both at work on the glass. It will be but a few months more before the glass is finished, when it will be sent here ready to be put in place. The objective is tested by artificial stars, in the shop, and is then mounted on a temporary tube for tests with heavenly bodies. It is expected that it will take one and a half or two years to mount the glass after the polishing is completed.

The great dome to cover the 36-inch refractor will be constructed of steel plates. The entire dome will be 75 feet in diameter and will weigh about 93 tons. The north dome at the northwest corner of the peak of Mt. Hamilton contains one of Clark's 12-inch equatorial telescopes. In the center of this dome is a massive brickwork pier supporting the telescope mounting. The meridian circle house, resting on solid foundations of masonry, is completed and equipped, containing a 6½-inch meridian circle furnished by the Repsolds of Hamburg, mounted on brick piers set upon the rock foundation of the summit. This building is of peculiar construction, with double walls of iron and wood, affording an admirable system of ventilation. It has two collimators of 6½-inch aperture, and many convenient arrangements for scientific work. The *mire* stands 75 feet from the north end, and the south collimator is viewed through a lens fixed to the collimator pier.

Of portable instruments the observatory possesses a comet-seeker, a Repsold universal instrument, and a small equatorial mounting in which the 6½-inch objective of the south collimator can be used. The observatory is also liberally supplied with the necessary auxiliary instruments, such as electrical apparatus, chronometers and sidereal clocks, so that after the mounting of the great equatorial telescope its instrumental equipment may be regarded as complete. The observer's house, for the director of the observatory and astronomers who may be in residence there, was furnished in 1884. It will be several years yet before the whole observatory will be in order for systematic, original work.

CHEAP MINING LABOR.—N. H. Gim, a Chinese contractor, has sued the "Mine d'Or de Quartz Mountain Societe Anonyme" to recover \$40,000 for an alleged breach of contract. The plaintiff contracted in August, 1884, to furnish the defendant corporation with 360 common laborers, fourteen cooks, four interpreters and twelve blacksmiths, but upon December 30th the company ceased work and terminated the contract without giving two weeks' notice. The plaintiff therefore claims to have been damaged in the sum named, through being obliged to furnish the men with food, transportation, etc. In the complaint it appears that the wages paid by the contractor were at the rate of 25 cents per day for laborers, 30 for cooks, 40 for interpreters and \$1 for blacksmiths.

THE suit of the Champion mine against the Wyoming, Nevada City, will soon be decided. The plaintiff asks an injunction restraining defendant from further working in ground claimed by the former; also, for \$300,000 damages.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Dillon, Montana.

[From Our Traveling Correspondent, R. G. HUSTON.]

Dillon is the county seat of Beaverhead Co., 70 miles south of Butte, on Utah Northern railway, and is really a railroad town located in Beaverhead valley, 25 miles from the junction with Big Hole. It is surrounded by a fine agricultural valley and a good stock range also. At the present writing (Feb. 20th) the roads are dry and dusty and there is very little snow in the foothills, making it a stock owner's paradise for the winter.

Blacktail Deer creek valley puts into Beaverhead river some miles above Dillon and is the location of one of the finest stock farms in Montana, owned by Messrs. Poindexter & Orr. They have a range running up Blacktail valley some 30 miles, and they have a large number of thoroughbred horses. They have been engaged in breeding thoroughbred horses for nearly twenty years. There are many of the ranchers in these valleys who have large fine houses and barns and all convenient shedding for stock that would do credit to a much older country.

From general appearances Dillon was experiencing her dullest season at the time of my visit. The town has a population of 1400. It has one hotel, a number of restaurants and lodging houses, two banks, three or four fine general merchandise stores and the usual number of butcher shops and saloons. There is a

Fine Mining Country Tributary

To it. Argenta, 15 miles northwest of town on a large tributary of the Beaverhead, called Rattlesnake, is about half way on road leading from Dillon to Bannack. This town has been the location of three or four smelters at different times during the last 16 years, but for some reason they have never been successful in working the ores of the district; one reason has been that the leads are small and when the winter closes in they have no ore to run on and are compelled to shut down, and some of them have been poorly constructed and could not save the precious metals in the ore furnished in the summer season. At the present time there is but one smelter here and that is only operated in the summer season. The only leads that are making much of a showing are some three miles north from Argenta at what is called the springs. Messrs. Witter, Miles and Lawrence have a prospect called the Rena, and have a fine body of ore. It is hematite and carries a fine percentage of lead with from 20 to 40 ounces of silver, and from \$65 to \$80 in gold. They have an incline shaft down 65 feet and are now stopping on the 50-foot level. They are now working with windlass, but having struck a strong body of water in the shaft they cannot do anything below the 50 foot level. They will be compelled to put on pumping machinery before they sink any lower, and as far as they can see is a flattering prospect. A short distance from this and apparently on the same lead is a location called the Golden Era and owned by Geo. French. This ledge has a width of from five to six feet. Quite a number of tons of this ore was treated in the Argenta smelter and returned \$110 gold and eight ounces silver. The owner has a shaft down 55 feet and has stopped some. As he has not yet struck water he will have a chance to develop a good mine, at least he is now well satisfied with present prospects.

Bannack,

Located on Grasshopper creek, 25 miles from Dillon, west, is one of the first placers discovered in Montana, the first mines being struck here on the 17th of August, 1862, by some prospectors from Colorado. James Harby and William Roe, present residents of the town were with the party. For many years the camp has been lying dormant and not much was done in the way of developing any new placers or quartz mines, but those who have remained here so long seem now to be in a fair way to realize in future. During the past season Messrs. Williams & Co. have succeeded in getting bedrock in the main creek and worked a pit 20 feet square and cleaned up \$700. The gulch here is very flat and about 20 feet deep to bedrock, and as the bars all along have paid well down as low as they could work for water, it looks like a reasonable proposition that the main creek will be extremely rich. Messrs. Williams & Co.'s clean-up is now convincing proof that it will pay, and preparations are being made to systematically open the main Grasshopper creek. No doubt next season it will give employment to quite a number of men. These prospects in connection with the Blue Wing quartz district, which is within two miles of town, with other developments and machinery to be placed here this season make a fine showing for the old town of Bannack.

The Blue Wing District

Is two miles south of Bannack. The first mine of note that is now open and producing money is the Kent, owned by Messrs. O'Leary and Gallagher, who are taking out 100 sacks of ore

daily and shipping to Salt Lake and Omaha for treatment. The ore is yielding returns of an average of 150 ounces silver and a small amount of gold. They are well satisfied that they have a fortune ahead of them.

The Charter Oak is close by, and owned by Mike Herr, who is working in a modest way and shipping ore continually. The ore is the same character as that of the Kent, and it is thought that the owner is doing well.

The New Departure, owned and operated by Judge Brown, is a fine property. Two carloads of ore per month are being shipped, the returns averaging 200 ounces of silver. These are about all the producing mines here at present near town. There have been many others worked in the vicinity as far down as the free-milling ore went, but like some other districts in this Territory, as you go down the ore becomes base and the plant will not work it to a profit. The only mill in the town is owned by Phil Shenon, and he has successfully operated it for some years, but he is now figuring on putting in ten more stamps and remodeling it into a silver mill. By putting in a roaster he will be able to successfully treat many of the ores in the vicinity, and no doubt will have plenty to do, as the parties who are shipping ore from here have to select it and only ship the best; therefore a plant located here will get the benefit of all the second-class ore that may be lying around the dumps at all these mines. Mr. Shenon having ample means at his command, will no doubt make the works as complete as he can, and being a "live man" will push things along in fine shape.

The Bald Mountain District.

This district is 18 miles further up Grasshopper creek, and is tributary to Bannack for supplies and post-office facilities. The first mine in this district and really the one that has brought the district into prominence, is the Polaris. This is a contact vein, and owned and operated by Messrs. B. F. White, of Dillon and Phil Shenon and others of Bannack. The development thus far has been very satisfactory. There is a shaft down 85 feet, and some levels have also been run. They have shipped 200 tons of first class ore to Omaha, from which they realized \$30,000. The average size of lead as far as developed is nearly fifteen feet in width. It will run about 20 feet between walls, but 15 feet takes the most valuable portion of the lead. They now have 1000 tons of second-class rock on the dump that will average assay value of 40 ounces silver and \$6 to \$7 in gold and about 15 per cent lead, making even the second class rock a pretty good average and a good property to build a smelter on, and as all the parties operating this mine have ample means there is little doubt that at no distant day there will be one built for this mine. The mine at present shows a large enough body of ore to keep one of a pretty good capacity running on full time. The company are now employing 20 men developing and have just commenced to sink, intending to go down to the 200 foot level. When that is reached and the lead crosscut, it will be well developed. They have a very fine steam-hoist, the best in the county, not excepting the Cleopatra at Hecla.

The Odell mine is near by in this district and is owned and operated by the Dillon Mining Co., Thomas Connor, Sup't. They are working 12 men at the present time and have a large body of fine ore in sight. Reports say that a mill has been contracted for, to be in running order by June 1st. Their ore carries both gold and silver in paying quantities. Messrs. Garrett & Diment have also a fine showing in the Diment lode. They have shipped some ore of pretty high grade and realized \$80 per ton. The same parties have a number of other properties near here that look promising.

Elk Horn District

Is still further up the main Grasshopper creek about 10 miles. The Elk Horn mine was discovered a good many years ago, but owing to the character of the ore not much was done on it and it was relocated several times.

The Simpson mine is owned and worked by William Roe and Joe Gauthier, who are operating it in a modest manner, and shipping ore right along to the Omaha smelting works, realizing returns of about 100 ounces per ton, with which they are contented.

The Storm is the property of Wm. Roe, and is now being operated by O. C. Henry (a Colorado man) under a bond and lease. The amount of bond I did not learn, but as it was the first mine taken hold of by outside parties they probably have a reasonable figure. This is the best developed mine in the district, having a tunnel in 400 feet and a well-defined lead from ten to twelve feet wide. The ore runs on a close average about 100 ozs. to the ton. Mr. Henry is a wide awake man and seems to be well satisfied with his contracts.

The Red Sky is in close proximity and is owned by Mr. Fred North, but is now being operated by Messrs. Fyhrle and Cavanagh under a lease and bond of \$10,000.

The Meteor in this same district is owned by Potter and Timbey, is only a prospect, no developments being made beyond a shaft 12 feet deep from which they have had some fine assays ranging from 104 ozs. silver for the lowest and 300 for the highest. They have had offers to bond and lease but prefer to wait until spring opens and develop it themselves, and abide by the results. There is not much chance for outside prospecting in this camp in the winter as the snow falls very deep on the range of moun-

tains. It lies close up to the Salmon river range and is very cold. These mines are in the same range and only ten or twelve miles distant from the Hecla Consolidated Co. mines, consequently they are in a region that has some of the best dividend paying mines in the United States, which is a recommendation that should not be overlooked by parties seeking for investments in comparatively undeveloped mines. With but few exceptions in the different mining camps I have visited throughout the territory the outlook for the future is brilliant, and in most cases my opinion is backed and borne out and satisfactorily proven by the production; so that there is no pecuniary consideration influencing me in advancing my opinion.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

KILN FOR BURNING BRICKS.—Wm. Jones, S. F. No. 336,720. Dated, Feb. 23, 1886. This kiln is specially adapted for burning Portland cement or other substances with petroleum gas, coal or other suitable fuel; and it consists of a kiln built on independent movable sections or parts within which the material to be burned is placed; the ends of each section being left open and a temporary joint or coupling provided between their adjacent ends, whereby they may be converted in one continuous kiln, which can be moved as a whole, and each section of which, after its contents are sufficiently burned, can be disconnected for discharging and reloading.

FIRE ESCAPE.—Joseph Bien, San Francisco. No. 336,887. Dated March 24, 1886. This fire escape consists of a wire rope, cord or cable, a drum or reel on which it is wound and from which it is paid out, and a brake mechanism acting against the drum or reel and operated by the suspended weight to regulate the rotation of the drum. It further consists in a suitable casing on which the drum is mounted, provided with a bottom opening, and a roller for the emergence and guidance of the wire rope; oppositely moving bars, passing loosely through and pivoted to the casing, whereby the brakes are operated, pivoted levers and link by which the bars are suspended and in details of construction relating to the brakes and the guidance and operation of the several parts.

SACKING ATTACHMENT FOR THRESHERS.—C. F. Prentiss, L. G. Stone and H. Fisher, Woodland, Yolo county. No. 336,665. Dated Feb. 23, 1886. The grain when delivered from the cleaning-shoe of the threshing machine is usually received into a horizontal spout, through which it is carried to one side by a screw or auger which revolves within the spout, and as this spout is often too low for conveniently sacking the grain recourse is had to an elevator, by which it is raised and delivered into sacking spouts. In places where there are strong or prevailing winds it often brings the sacking attachments in such a position that the chaff and dirt from the machine are all blown to that side, making it very inconvenient for the sacker-tenders and sewers. It is often impossible to change the setting of the machine so as to overcome this objection. In this invention the mechanism is so arranged that the grain may be delivered at either side of the machine, there being sacking spouts and attachments at both sides, either of which may be used at will.

DRUM ATTACHMENT FOR PIN RAILS.—Alexander F. Spear, S. F. No. 337,029. This is an attachment for the belaying-pin rail of vessel, and it consists of a cylindrical drum and means for attaching it to the rail. In unloading a vessel there is rigged up to the end of the yard a tackle known as a "hurton," one end of which is attached to the fall of the engine or lifting rope, and the other end is usually passed back and forth over several belaying-pins in the pin-rail, which is protected by a bent plate called a "rail-hox." The function of the hurton, as is well known, is to guide the load over the side and slack it away, and this is done by the operator hauling in the slack of the hurton as the load is hoisted and slacking away again when in proper position to be lowered. So much friction is caused by the hurton slipping on the belaying-pin that it wears out in a short time and is rendered useless. A new rope or a fresh portion of a whole coil has then to be rigged. It is the object of the inventor to obviate the expense by providing a drum for the guiding rope or hurton, which takes the place of the ordinary rail-hox, and is adapted to be readily secured to the pin-rail.

BAND-SAWING MACHINE.—John J. Bowen, S. F. No. 336,693. Dated Feb. 23, 1886. This improvement in operating band-saws consists in the employment of a supplemental driving belt, extending between the upper and lower pulleys of the saw, said belt being deflected invariably upon one or both sides at points between the pulleys and having a tightening and compensating mechanism by which the tendency of the upper pulley to over-run will be checked, and the two pulleys caused to run more completely in unison. In the construction of band-sawing apparatus the lower pulley or wheel is usually driven by any suit-

able gearing, and the saw passing around this wheel extends upward, passing around a similar wheel at the top, which it also acts to drive, so that the two rotate and carry the saw. In order to give the saw sufficient hold, and also to cushion it properly, the faces of the wheels are usually covered with leather or some similar elastic substance, but this wears out rapidly and must be replaced at considerable expense of time and money. The saw is subjected to very considerable and irregular strains by reason of the tendency of the upper pulley to over-run or run faster than the lower one, especially in large saws where the pulleys are eight or ten feet in diameter. By the use of the supplemental driving belt, with the deflecting and driving pulleys invented by Mr. Bowen, this fault is corrected, as the belt holds the upper pulley and any tendency of the pulleys to over-run will cause the frame which supports the deflecting pulleys to move transversely in its guides, thus keeping both sides of the belt equally tight and preventing this difficulty.

HEATER FOR BARRELS.—John L. Koeter, S. F. No. 336,239. Dated Feb. 16, 1886. This invention relates to that class of heating devices which are used for heating barrels; and the invention consists in the construction of the smoke-flue within the cylinder of the heater, and in a surrounding casing extending but part of the height of the cylinder. The object of the inventor is to make as simple a heater as possible by incorporating the smoke flue in its body, and also, by means of the encircling casing, to equalize the heat and distribute it more evenly over the barrel.

VALVE ATTACHMENT FOR WINE CASKS.—Thos. S. Glaister, Sonoma. No. 335,751. Dated Feb. 9, 1886. Large wine casks are provided with a door in one end or head, near its lower portion. In this door is a bung-hole, which is closed by a plug. When the wine is ready to be drawn off the plug is removed and the faucet inserted. Sometimes the plug is removed outwardly, in which case several gallons of wine are wasted before the faucet can be seated on the bung-hole, for the casks are so large that there is a great pressure of liquid, and it spurts out with much force, rendering it somewhat difficult to insert the faucet. Sometimes the plug is driven inwardly by the faucet, which is subjected to blows to this end, and by following the plug into the bung-hole is thus inserted without loss of wine; but this process is open to a serious objection, namely, the agitation under the blows on the faucet and by the indropping plug of the contents of the cask, and the consequent stirring up of sediment. The object of this invention is to overcome these difficulties by providing a valve for the bung-hole, which remains normally closed under the pressure of the liquid, and which may be readily opened by the insertion of the faucet.

CLINCHING-PUNCH.—John R. Watson, Sacramento. No. 337,036. Dated March 2, 1886. This punch consists of two handled and pivoted jaws, a die in one jaw having a beveled or V-shaped point, an adjustable socket-head in the other, and a peculiar locking-plate for holding said bed rigid to resist the material under the thrust of the die, and for releasing the bed to allow it to move out of the way of the clinching surfaces or faces of the jaws. This tool is intended to punch and clutch at the same operation. Though the tool may be used for many purposes, the inventor's special object is to apply it to the sealing of railway cars. It is customary, when the car is about to leave a station, to pass a strip of tin through the lock-staple, and, after winding it around until its ends overlap, to punch the two layers or double thickness, with an ordinary punch, which has then to be removed and turned around to the reverse side of the tin strip, and again operated to clinch the small tongues or burrs made by the pinching die. This is known as sealing and its object is apparent. By the aid of this tool the punching and clinching can be done at a single operation, and thus save time and labor.

MACHINE FOR DRYING VARNISHED LABELS.—Carl Rahsskopf, S. F., assignor to Schmidt Label and Lithographic Co. No. 355,771. Dated Feb. 9, 1886. This patent covers a new machine, the object of which is to dry wet or newly-varnished prints, labels, etc., and it consists of an endless serpentine carrier, consisting of side chains and parallel spaced transverse bars adapted to receive and carry labels, etc.; power-transmitting mechanism for driving the carrier; a clutch mechanism operated and controlled by the varnishing press for regulating and controlling the periodical movement of the carrier; a novel arrangement of swinging flaps for feeding the labels; an endless transverse belt located between the flaps and adapted to receive the labels and deliver them to the carrier; and a mechanism operated and controlled by the press for periodically moving the belt. Labels are put through the varnishing press rapidly and are too wet to handle immediately after being varnished, and much time is wasted by attempting to take them by hand and remove them to any drying apparatus; but by means of this new machine the labels are not touched by the operator, but are carried by the mechanism of the varnishing press through intermediate devices to the carrier, and are moved along it for a length of time equal to the carrier, so that when they come out at the other end they are comparatively dry and can be easily handled.

MECHANICAL PROGRESS.

Malleable Castings.

The average apprentice, also the average journeyman iron-worker are led to believe that to make cast iron malleable requires only to encase the same in a metal box, to heat the same for a number of hours, and to let it cool gradually. Such is, however, erroneous. Malleable castings, in the shop phrase, are termed "malleable iron," which is also wrong. The proper term is malleable cast-iron.

To make malleable cast iron the following formula must be resorted to: First the irons are usually cast of red hematite pig from the cupola furnace the same as any ordinary casting. After removing them from the sand, they are separated and placed in the rumblor, a cylinder of heavy sheet-iron fastened to a shaft. In the rumblor is also placed sharp, gritty sand, gravel and pieces of broken iron. The door or lid is then closed or fastened, the belt then put on to the pulley on the end of the rumblor-shaft, which sets the rumblor in motion. The object of this operation is to remove the sand and oxide or scale on the castings, and to cut down the rough places on them. In due time the irons are removed from this rumblor, and are quite bright and have the appearance of having been roughly polished.

The next process is the preparation of the chemicals which, with the aid of heat, are to make the surface of the castings malleable. These chemicals are steel oxide, or the scales which fall from steel in its manufacture or when it passes through the rolls, the same in appearance as the scales which fall from iron when being forged on the anvil. With the steel oxide is mixed a proper quantity of sal ammoniac, which has the effect of making the oxide stronger. The oxide takes up the sal ammoniac as each has an affinity for the other.

The next process is to place a layer of the compound in a cast iron box; then the castings are placed in layers, each layer being covered with the compound and the box well shaken to cause all the interstices or spaces between the irons to become filled. When the box is thus nearly filled a heavy or thick layer of the compound is placed on the top of the last layer of castings. The lid is next put on and secured very firmly. Then all the joints formed by the box and lid are thickly luted or pasted with fine clay or mortar, which is to make the box absolutely air-tight.

When all is in readiness, the boxes are placed in a large brick furnace lined with fire-brick or fire-tiles. A fire is then made, usually from anthracite—hard coal—and kept at a continuous glow for four, five or six days, according to the size and shape of the irons being treated. While the cast-iron is in a state of red heat it takes up the oxide, or such parts of it as it has an affinity for, on its outer surface, and, being free from the action of air, cannot throw off any of its own oxide and become smaller than when placed in the box. In due season the fire is allowed to cool down, the boxes are removed from the furnace, and when cool enough not to be affected by the atmosphere the castings are removed and are then the malleable castings of commerce, the malleable skin varying from 1/64 to 3/32 of an inch, which allows of their being malleated or worked to a certain extent whether cold or hot. By care and a little practice malleable castings can be welded together onto iron or steel, the process being the same as welding cast-steel or spring-steel. It is almost next to an impossibility to make malleable castings strictly uniform. The gradual heating and cooling of cast-iron would only rot it, and would not make it malleable. — *Carriage Monthly*.

Titanic Steel.

A recent number of the *Mechanical World*, London, says that a new process for the production of titanic steel has been in full operation for about nine months at New Islington, Manchester. There are several patents involved in the method of manufacture of this commodity, all owned by the two partners of the firm, Messrs. Bott and Hackney. The castings obtained from this new metal have recently risen very greatly in the estimation of the engineering firms in Lancashire, as well as others at a remote distance, and we are not surprised at this, as the properties of the metal are truly remarkable. In a recent visit to Messrs. Bott and Hackney's works numerous castings were seen of all manner of shapes and thicknesses, and we were agreeably surprised and pleased at their excellence and faultless character; the castings are made in the ordinary green sand, and the surfaces are quite free from holes, flaws or other bad places. The cast metal can be readily forged and hardened or annealed just like a piece of tool steel; for example, we saw a part of a broken wheel with a bit of rim sticking on forged out to a taper form, and then, after heating to red heat, suddenly plunged into cold water, without showing the least signs of distress or fracture; after this severe treatment a piece was broken off, the fracture showing an exceedingly fine grain. It will be seen at once that a metal which will allow of such treatment is admirably adapted for use for parts subject to great shock, such as wheels. One engine-builder in Manchester is adopting this metal for the working parts of his small high-speed engines, as well as for some of the parts

of large engines such as the piston rod and cross-head; in some instances these have been made in one casting. For chain work this special steel is to be commended both on account of its great strength and toughness. Mr. Bott has a special form of link chain for elevator purposes, which, by an ingenious arrangement does away with the rivet connecting the separate links. The connection is made by means of a round bar having a projection on one side which will only allow of insertion or withdrawal when the links are in a certain position. When the pitch of links on one side is much worn, this chain can be reversed, its life being thus greatly prolonged. Elevator buckets made from titanic steel are exceedingly tough, it being impossible to break them by ordinary usage; these buckets are only about one eighth inch thick. Hammer heads and horseshoes are among the numerous productions for which this steel is specially adapted, and for which purposes it is coming into much more general use. The above is a brief description of some of the properties of the new steel; shortly we hope to give an account of the manufacture.

A HIGH-SPEED ENGINE.—During the last year or two, says an English paper, it has come to be generally understood that large machines driven at a comparatively low speed are the best for electric lighting purposes, but the lighting at Lincoln's Inn Dining Hall and Library must be considered as an exception to the rule. The dynamo there is driven at no less than 12,000 revolutions a minute by a Parsons high-speed engine, which justifies its title by running at the same rate. It requires some mental effort to take a statement of this kind seriously, yet there is no reason to regard the Parsons motor as a toy. It was shown in action at the Inventions Exhibition, running with unimpaired steadiness from the beginning to the close of the show. It is in reality a combination of turbines driven by steam, and consists of two series of parallel-flow turbines to the right and left of a central steam inlet, the steam exhausting directly from the first turbine into the second, from the second into the third, and so on through 20 turbines in each series. The steam parts with a portion of its energy in each turbine, and finally escapes at a pressure not much above that of the atmosphere.

RUSSIAN SHEET IRON.—The following method of manufacturing Russian sheet iron is given in "Calvert's Almanac." Selected iron is hammered into slabs of the right size, and to make a finished sheet the slab is passed through rolls, making 75 to 80 revolutions, three or four times, after which it is hammered again. Several sheets were then heated to a full red heat, covered with charcoal shaken on to them from a bag made of coarse linen, and are then piled with covering sheets of heavier iron top and bottom. The piles are then worked down under a heavy hammer until nearly of the finished size. When cool the hammering ceases, the plates are separated, reheated, and piled again with cold plates interposed, the hot and cold sheets alternating in the pile. The hammering is then repeated until they are cool, after which they are cut to size.

WIRE BELTS FOR CUTTING STONE.—The principle of continuous motion, as in the belt saw for wood, is fast working its way into general use in Europe for stone cutting. We have already alluded to this new method. A late number of *London Engineering*, after alluding to its successful use, says: "Instead of a flat metal band, three steel wires, twisted together and run at a very high speed, form the cutting surface. Water and sand are applied in the usual manner with the ordinary flat saws for stone. It is claimed that such saws advance in marble from 10 inches to 24 inches an hour, according to the hardness of the stone. It is also used for quarrying purposes, in dividing up masses of stone projecting between recesses in the quarry."

PERFECT COMBUSTION OF NATURAL GAS IN FURNACES.—E. J. Dashbach, of Pittsburg, Pa., has invented a new apparatus for the aforesaid purposes. It is the application of the Argand burner principle to the new fuel. It has been introduced at the mills of Jones & Laughlins, and at the Linden Steel Works, where, it is claimed, the heaters are enabled by its use to make their heats in one-third of the time formerly required, that is, in one hour instead of three hours. The new process is said to be a great economizer of natural gas, enabling the furnaces to run on two ounces of pressure, and as the combustion takes place in the furnace the stacks are not burned. — *American Manufacturer*.

AN EXCELLENT CEMENT.—A good authority says that a first-class cement with which to fasten stone to stone, or iron to iron, is made by mixing a paste of pure oxide of lead, litharge and glycerine. This mixture hardens rapidly, is insoluble in acids and is not affected by heat. It has been used to fasten the different portions of a fly wheel with success, while, placed between stones and once hardened, it is easier to break the stone than the joint.

No two locomotives will ever work just alike. Though built exactly after the same model they will have different rates of speed and drawing power. This difference in speed has been known to reach 15 miles an hour,

SCIENTIFIC PROGRESS.

Artificial and Natural Moisture.

There is a wide difference between the effect of natural and artificial moisture in the atmosphere of a room. This is particularly observable in a cotton factory, where a certain degree of moisture is required in order that the fiber may be properly manipulated. Dry winds greatly interfere with such work, especially when they are continuous for several days. Natural advantages are generally utilized in locating mills to secure moisture, such as so placing them in valleys which open toward the direction of moist winds, locating them upon clayey, damp ground, etc. In some instances large shallow reservoirs of water are placed upon the mill-roof or in its near vicinity, so that the natural evaporation from the same may be taken advantage of.

Naturally, attempts have been made to moisten the air of mills by allowing the escape of steam into the rooms, or by arranging for the dripping of water in some part of the room, but all such artificial means for creating moisture are found to be quite defective; the moisture does not have the effect upon the fiber which is observed from natural moisture. One cause of the difference, no doubt, arises from its irregular quantity when so produced, but there are evidently some peculiar conditions connected with the particles of natural moisture which do not exist in those which are artificially produced. Moreover, artificial moisture added to the atmosphere causes the machinery to rust much more extensively and is productive of colds among the operatives to a much greater extent than natural moisture. Curiously enough, the difference does not seem to be as marked in this country as in England.

Experience has fully proven that there is a certain condition of the atmosphere which is more favorable to the working of cotton than any other, and any variation, be it even very slight, is noticeable in the work. The proper degree of moisture is usually regulated in American mills by means of a reliable hygrometer.

Thick brick walls are found to be excellent distributors of moisture. The walls absorb moisture from the air, both within and without, and give up a portion of it when the air becomes too dry. A very curious fact in this connection is that the walls affect different stories in the mill very differently.

The quantity of water absorbed by the atmosphere is much larger than is ordinarily supposed. Let us consider what might happen in a work room on a cool day in early spring. We copy from a paper read before a late meeting of the Lowell Overseers' and Artisans' Association: The morning would be likely to be cold, the room would be warmed artificially until its temperature reached about 70°, and in order to moisten the air, steam might be blown into the room. The presence of any water in the vapor in the air could not, by the ordinary sensations of the work people, be perceived until the air had become nearly or quite saturated. Let us suppose that the steam had been let in so slowly that the air did not get nearly saturated until 2 P. M., when, on account of the warming of the room by the sun, the temperature has risen to 73°, when the supply of artificial heat is shut off. Let us suppose our room contains 300,000 cubic feet, and that when the artificial heat was shut off that the relative humidity had risen to 90°. If such had been the case there would have been $1.27 \times .90 \times 300 = 342.9$ pounds of water vapor in the room, or 42.8 gallons of liquid water if it were condensed. The air soon begins to grow colder outside, and there is a flow of heat set up from the inside of the room to the outside air, through windows, walls and doors. The steam continues to enter the room, tending to keep up its temperature, but the heat escapes more and more readily as it grows colder outside, and finally the temperature begins to fall within the room, and very soon falls to or below the dew point. The effect of any further outward flow of heat will be a condensation of water within the room, the latent heat of the condensed vapor being given up to make up for the outward drain of heat. This condensed water will collect upon the objects within the room until it can be noticed that they become moist, when perhaps the inflow of steam will be stopped. The temperature of the room, although falling, has not reached an uncomfortably low point, since a moist air is not uncomfortable until it is several degrees colder than is the lowest comfortable temperature of a dry air.

It is pretty near shutting down time also, the overseer and everybody else are getting ready to go home and do not think of what is going on in regard to the humidity of the air. The heat, however, is flowing out faster and faster, the temperature falling and the water vapor condensing all over the room. Suppose that the temperature has fallen to 60°, let us see what has happened. There will now be only .82x300 or 246 pounds of water vapor in the room. In other words 342.9—246=96.9 pounds of water vapor have condensed into 12 gallons of liquid water and settled upon the clothing of the work people, the machinery and other objects in the room, and in the cotton. Add to this the unknown amount which was condensed before it was noticed that condensation had begun, and we can readily believe that, under such circumstances, it would be found, as it was found in England, that moist-

ure artificially added to the air, causes the machinery to rust, the operatives to have the rheumatism, and, curiously enough does not have the same effect upon the cotton that natural moisture does!

The writer seemed to be under the impression that all this trouble might have been prevented by shutting off the steam that was blowing into the room, at the proper time and maintaining a more nearly uniform temperature during the day. He further expresses the opinion that American experience does not show that artificially added moisture, when properly regulated, presents any perceptibly different effect from that which is natural. This opinion, however, differs from that of most observers.

THE CANT ABOUT "PURE SCIENCE."—It would seem from observations not unfrequently bazzarded by some very superior persons, whose happy mission it is to put the rest of the world to rights, that there is something derogatory to the man of science in making his science subservient in any way to the requirements of his fellows, and thereby contributory to his own means for the support of himself, and of those depending upon him. Now, on this not uncommon cant of the day, a little plain speaking would seem to be very much wanted. While the investigation of nature and the interpretation of natural law are admittedly among the highest, as they are among the most delightful of human occupations, the right application of natural law to effect desirable objects is in itself a scarcely less worthy occupation; many of these objects being of paramount importance, and attainable only by the exercise of high scientific sagacity. In this manner, as in so many others, this sense of proportion is but too often lost sight of. Because the investigations of a Newton, a Darwin, a Dalton, a Joule and a Faraday have an importance of which few among us can adequately conceive even the measurement; because among the scientific men now or but lately living in our midst are to be found those whose investigations in pure science have not only won for them a high renown, but have earned for them the gratitude, and should have obtained for them the substantial acknowledgments of their country and the world; and because even the minor investigations and discoveries that are ever being made in pure sciences have all of them their merit and their value, it does not follow that the mere accomplishment, it may be in an abundant leisure, of two or three minor investigations, however creditably conducted, are to lift their authors into a scientific position, altogether above that of men whose laborious lives have been spent in rendering their great scientific attainments directly serviceable to the needs of the State and of the community. — *Popular Science Monthly*.

INVESTIGATION INTO THE LAKE DWELLERS.—In his recent investigation of pile dwellings of the Lake of Bienns, Dr. Studer has met with two extreme types of human skulls—the brachycephalic and the dolichocephalic; the former (at Schaffis and Lusery) belonging to the pure stone period, and the latter (found at Vinelz and Sutz) to the bronze period. These facts point to an invasion by the bronze men, involving a complete transformation of the group of domestic animals; the horse appears for the first time, and new races of sheep and dogs drive out the old forms of the stone period. The occurrence of mesocephalic, and even much shortened, skulls of the bronze period shows that there was no extinction of the brachycephalic race, but that the two races mixed. This mixture of races in prehistoric times increases the difficulty of tracing back the skull forms of the present population. Dr. Studer suggests that the Rhaetian short headed type may be referred to the old dwellers of the stone period, in which case the prevalent dark hair, eyes, and skin, of the present natives of Graubünden may recall the aspect of the older prehistoric race. There is also a large dark population about the lakes in Canton Berne. — *Nature*.

ARSENICAL COMPOUNDS.—A small quantity of arsenic introduced into soap constitutes "arsenical soap." In dyeing works it is used to give brilliancy to the reds. Calico printers' soap is called "arsenical soap." In the dye works it is called "printers' soap." Arsenate of copper is a green color, used in paper-printing for wall papers, but it is injurious to health and is now but little used. Arsenate is a salt formed by arsenic acid combined with any base. Arsenic is a metal of a steel gray color and brilliant luster, though usually dull from tarnish. It is very brittle and sometimes native, but usually combined with silver, nickel, iron, antimony and sulphur; orpiment and realgar are two of its sulphur compounds. Orpiment is the true arsenicum of the ancients. There is arsenical vapor, and an ore of silver containing arsenic. Arsenic acid is composed of two equivalents of arsenic and five of oxygen. Orpiment is the trisulphide of arsenic occurring in crystals, of a lemon color and having a resinous taste.

THE SPECTROSCOPE.—By means of that remarkable instrument of modern research, the spectroscopic, the otherwise absolutely imperceptible motion of so-called fixed stars is not only detected, but measured. Sirius is found to be now approaching the earth at the rate of 20 miles a second, while a few years ago this notable star was receding from us 25 miles each second.



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Passing Events.

First-class fares to New York from this city by rail reached the low price of \$25 one day this week. The trains both going and coming are very large and crowded. Those leaving are going on visits, and many of those coming are here to stay. Nothing has happened for many years so conducive to the interests of this State as the prevailing low rates. A very desirable class of people is coming here to settle. Moreover the tourist travel is to our advantage in many ways. The freight rates are low, too, allowing us to ship large quantities of home products to good advantage.

A feature of note in the mining situation of the day is the large amount of chloriding and tribute work going on in many of our districts. This system is beneficial to both mine-owners and miners, provided care is taken that the work is properly conducted. The plan is adopted in many new regions of late.

The reports of gold fields in the Sierra Madre mountains of Mexico, will scarcely attract many miners, as long as the Indians remain in that region.

The storm of the past week has added still further to the already good supply of snow on the mountains, so there will be plenty of water this spring and summer.

Reducing the Cost and Risk of Quartz Mining.

As a general thing it has been the practice of Californians owning or operating mines to begin at the beginning: that is, they have usually taken what are denominated mere prospects and developed them into productive, and as experience shows, almost always into paying properties. It has not been the custom, even with our home capitalists when making investments in mines to buy those already opened up and equipped with plant. This policy of taking many risks in a small way instead of large ventures on a seeming certainty, has in practice proved a wise one. It is the natural method, the course pursued by all practical men in founding a business. The merchant goes to work, and by careful management, creates his trade. The lawyer and the doctor laboring assiduously year by year, establishes each for himself a practice. The farmer clears and otherwise improves his tract of wild land, and little by little, converts it into a productive farm. These men may buy a horse to ride, a house to live in, or the implements necessary for the prosecution of their respective callings, but rarely ever do they buy or think of buying a business built up and furnished to their hand by another.

Adhering to the above plan our people have generally been fortunate in their mining ventures, and this for the reason that they have expended their money gradually, and only as there seemed to be warrant for the same. Being thoroughly acquainted with the character of the properties they were improving, they have been able to make these improvements to better advantage than could have been done by parties acting without this special knowledge. Then, too, these owners, being advised as to the weak and the strong points of such properties, have known when to sell and when to hold on, a knowledge that has not infrequently saved them from committing mistakes in this particular.

Pursuing a different policy the foreigner has not, as a general rule, fared as well in his mining ventures as has the home investor. Determined to accept none but a fully developed, outfitted and dividend paying property the former has been obliged to pay round prices for the same; the vendor consenting to sell only because he is getting what he believes to be its full value or because maybe he has detected in it somewhere a lurking infirmity, which latter is sure in good time to reveal itself to the consternation of the trusting investor.

Cases arise, it is true, in which mines already exploited and equipped with plant, and which may even be yielding large net revenues can be bought at a bargain. But these are exceptional, as any man possessed of ordinary business sense must know. The Californians are a generous people but their benefactions have not as yet run in the direction of selling productive gold mines for much less than their apparent value. If they do this they are apt to have a good reason for it. Hence it has happened that most of the losses incurred by outside investors have come through the purchase of just this class of properties. There is not a county nor a notable mining district in the State but furnishes evidence of this truth. The mines themselves are not dead nor have they in more than a few cases been depleted to a ruinous extent. The cause of failure was not that the properties were worthless, but that the purchasers paid a great deal too much for them—paid not only for the mines, but for the extravagant hopes and greed of the vendors.

Taught by experience, foreign investors, with out avoiding California, are beginning to adopt the plan which from the first has obtained among our own mining men—the plan of making their mines instead of buying them already made. Their agents, of whom there are many here, are looking about for good prospects, promising quartz lodes on which little or no expenditure has been made, and which for that reason they are able to get hold of at small cost, often on almost any terms they may choose to propose. There are in this State thousands of quartz claims located by prospectors, practical miners and speculators, who hold them simply with a view to disposing of them to others, the extremely liberal provisions of our mining laws making it possible for these locators to keep good their possessory titles from year to year. Affording no income and being in their present condition of little value to their owners, these

claims can be bought outright for very little money, or a controlling interest can be obtained in them in consideration of a certain amount of work being done upon them, ample time being given for prospecting them before final terms are concluded. While these claims are so profitless to the owners, the most of them possess more or less prospective value, the miner being too good a judge of quartz to waste his small means or expend much of his well-preserved energies on anything obviously worthless. In a majority of cases they offer some and generally sufficient inducement for even the most prudent to spend upon them money enough to determine their probable value, as this can be effected generally in a very short time and for a moderate sum.

Now, these California prospects, so multitudinous in number and so little explored, open, it seems to us, a wide and inviting field for mining enterprise and investment. The conditions under which they present themselves are everywhere good—so good that it would be useless to seek elsewhere for better. This risks to be incurred are here reduced to a minimum. The adventurer begins on something tangible and fairly promising and goes on as long as he thinks the prospect will justify, when he is at liberty to quit. Having expended a little money, he may stop when he likes. In no event need he take any desperate chances, going on spending his money blindly or plunging into debt. In the conduct of a business like this nobody need be financially ruined or even much hurt, while the outcome might, and very likely would be, the creation of several valuable properties for a moiety of the money one of these largely productive and elaborately outfitted mines would cost.

During the past few years, since the partial cessation of hydraulic operations has caused increased attention to be paid to quartz, this process of transforming these embryotic mines into lullion producers has been going on in a very marked manner. All over the State this work of evolution has been in progress, conspicuously so in Shasta, Nevada and Sierra counties, where scores of prospects have in this short time been converted into veritable bonanzas. In Shasta there are to-day several mines valued at more than a quarter of a million dollars each, that two years ago had never been heard of, for the reason that they had then neither an existence nor a name. The Young America, which with one small mill is now netting its owners \$20,000 per month, was then spoken of as a quartz claim situate somewhere along the rocky slopes of the Sierra Butte, not ten miners in the district having ever felt enough interest in it to inquire or care where it was located. Eighteen months ago, the Delhi mine, down on the San Juan Ridge, near North Columbia Hill, Nevada county, was a nonentity. Since then it has been literally created, and with an eight-stamp mill has brought the owners such revenue that they talk of half a million as about the proper selling figure for the property. And now come the experts and asseverate that they would just as soon take the chances of developing a pay chimney in any one of the dozen ledges near by, as they would in the ledge of the Delhi Company, from all which it may be inferred that there are great possibilities in that neighborhood.

And so we might go on and cite many other examples tending to establish the wisdom of taking up and utilizing these prospects, here so numerous, so easily gotten hold of, and so many of which have already enriched those who had the sagacity to turn them to practical account. We do not speak of these claims as mines, but only as the ready means for making mines. We present them as part of California's great store of opportunities.

The State Mining Bureau is now open at its new quarters in the Pioneer building on Fourth street near Market. The new rooms are large and well lighted. The Bureau occupies the top floor of the building, but an elevator runs between ten and five o'clock daily, rendering an inspection by visitors quite easy.

The discovery of rich placer diggings in the Magdalena mountains, in Sonora, will not cause the rush from along the border which would have followed had not the Apaches been roaming over the district. Geronimo is known to have a strong band with headquarters in the Sierra Madre.

Secular Variation of the Magnetic Declination.

By authority of the superintendent of the U. S. Coast and Geodetic Survey, President Davidson, at the last meeting of the Academy of Sciences, communicated an unpublished official report upon the "Secular Variation of the Magnetic Declination at San Francisco."

The data available for a rediscussion of this secular variation have lately been sufficiently increased to make a recomputation desirable. This has been done, and the result is such as to give us a satisfactory knowledge of the magnetic declination during the past one hundred years, as well as furnishing the needed predictions with safe data for the charts of this part of the Pacific Coast.

Some years since, Prof. Davidson, who had been annually observing the magnetic declination at the Presidio station, called attention to the fact that a maximum Eastern variation was close at hand. Moreover, he collated from manuscript voyages of Bodega and others, 1774 to 1790, over three hundred recorded magnetic variations on the Pacific Coast. *

With the accumulated material, Mr. Schott, the chief of the computing division, has found the epoch 1895 for the maximum Eastern magnetic declination, and the value thereof 16° 36'. This has been derived from the expression:

$$D = -13.81 + 2.79 \sin. (1.0 m - 134.7).$$

A full discussion was made of the variations noted by the above-mentioned Spanish navigators, and their work is pronounced admirable; the probable error of a single determination being ± 0.55 .

The isogonics for the Pacific Coast from Caps San Lucas to Vancouver Island for the epoch 1783 are given by the formula:

$$D = -10.3 - 0.381 \Delta \text{ Lat.} - 0.132 \Delta \text{ Long.}$$

cos Lat. - 0.0006 $\Delta \text{ Lat.}^2$, where D is the eastern magnetic declination for 1783.3, and

$$\Delta \text{ Lat.} = \text{Long.} - 31.9, \text{ or difference in latitude.}$$

$$\Delta \text{ Long.} = \text{Lat.} - 118.7, \text{ or difference in longitude.}$$

This formula will answer for the space within 250 miles of the coast. By means of this formula the first value obtained for San Francisco in 1783 was 12° 54' East, and for this epoch the secular variation formula gives 12° 47.5' East.

The great value of the observations by the Spanish navigators in this latter part of the last century is in the results enabling a formula to be deduced applicable to every part of the coast specified.

One advantage of this formula will be that if there be no local attraction at a given station a surveyor can compute the magnetic declination closer than he can observe it with the ordinary instruments at his disposal. At all events the computed declination is a severe check upon his observed declination.

Appendix No. 9, U. S. Coast and Geodetic Report for 1885.

THE coal miners and lumber men of Washington Territory are protesting vigorously against removing the duty from coal and wood. The protest says that if these articles be put on the free list every coal mine in Washington Territory will have to shut down; and that nearly every sawmill will have to stop. It says that Washington Territory cannot compete with British Columbia in either lumber or coal, as the forests and mines in that country are nearer the sea than those in Washington Territory. It states that the miners of British Columbia can sell coal 50 cents a ton cheaper than the miners of Washington Territory, on account of cheaper transportation. The petition concludes by predicting that 10,000 men in Washington Territory will be thrown out of employment if coal or lumber is placed on the free list.

THE CHINESE IN AMERICA.—As long ago as December 1879, Rev. O. C. Wheeler, D. D., LL. D. delivered an address on "The Chinese in America," treating it as a national question, and foreshadowing much that has since occurred in connection with this subject. The address, printed in pamphlet form reviews the whole Chinese question in an able manner, and the remedy suggested is "to check, to modify, to stop the immigration." Dr. Wheeler discussed the subject in a dispassionate manner, and his remarks were to the effect that if the Chinese were not prevented from coming here they would gradually undermine and control many of our profitable industries, as has since been seen to be the case.

Silver and Gold From Black Copper.

No. 2.

The accompanying engravings represent the solution vats and the launders, as indicated by the lines giving title to the respective cuts.

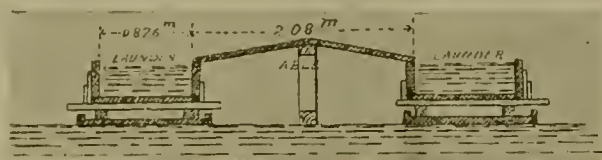
The solution vats are placed in a line; in front of them are slightly inclined launders lined with lead, which communicate with a series of others at right angles to these. The liquor flows over the bottom in a thin stream, and as the temperature is very much lowered by the exposure to the air of such a very large surface, the crystals of copper sulphate deposit on the bottom of the launders.

These launders are arranged in three double rows for every six solution tanks, the first one being 20 meters long and the two others only nine meters. Between each set of two troughs there is a doubly inclined table, covered with lead, on which the crystals as they form on the bottom are thrown to drain. The distance between the two troughs is two meters. The width of the aisle between each set of troughs is 1.50 meters. The total length of all the troughs is 106 meters, and they have 93 square meters of surface. At every angle a little dam is made to make the liquors fall over it and thus further to cool it. When the crystals have accumulated on the bottom sufficiently, they are detached with shovels and thrown up on the inclined tables to drain. After they have drained they are washed with water supplied by four tanks, three by two meters and one meter deep, placed on one side of the tables, in order to remove the acid mother liquors, and after they have again drained are collected in barrows to go to the solution vats. As no attempt is made to separate it, all the insoluble material which comes from the copper is taken up with the crystals as they form. These are cleaned up two or three times a day, the strength of the solution being kept as nearly uniform as possible. The spent liquors are run into a tank 2.40 meters square, from which they are again pumped up by an injector to be used again. The crystals which form nearest to the solution tanks are the richest in precious metals. Those which form at the end contain less silver and considerable gypsum. The fine material, which remains a long time in suspension, is composed mostly of compounds of arsenic, antimony, and lead. All of the crystals must be sorted according to their composition. This is done by keeping separate all

Variable Motion to Concentrators.

Adams and Carter, of this city, have obtained a patent through the MINING AND SCIENTIFIC PRESS Patent Agency for certain improvements in that class of concentrators like the Frue, in which is employed an endless traveling belt upon a frame or table to which a shaking or vibratory motion is imparted. The

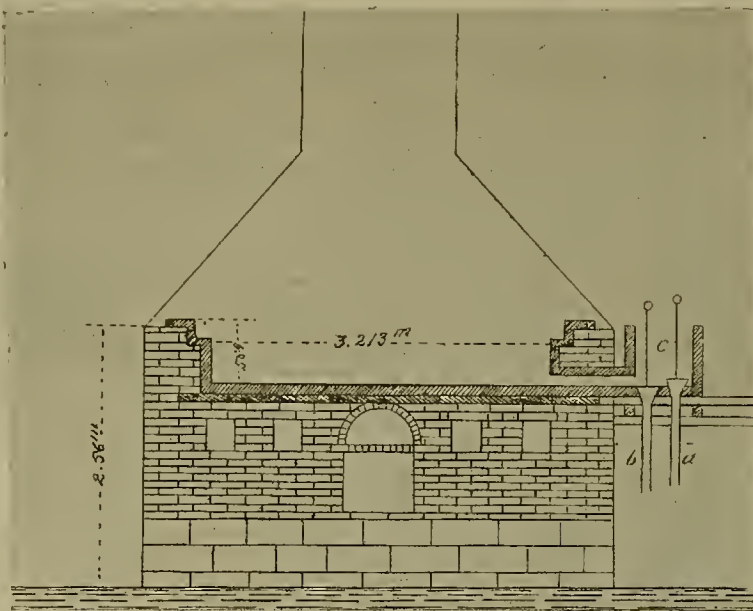
so that a complete rotation of the driving or side shake shaft gives two rotations to the other. The cranks of both these shafts are "quartering," that is to say, their starting centers are removed by 90 degrees. This quartering of centers of the cranks, together with the proportional or relative sizes of the gears or pinions, results in imparting to the table a motion which may be correctly described as



SECTION OF SOLUTION LAUNDER.

improvements are such that, by reason of the variable and modified motions which are imparted to the machine, it is adapted for more general application than the ordinary concen-

trators to which a single movement is given. Different kinds of ore and other material may therefore, be treated in this new concentrator and be subjected to the more advantageous



SOLUTION LAUNDER.

ing as described, and changing the gear on the end shake shaft for one which has the same number of teeth as the gear on the side shake shaft, each point of the table is caused to move

through a perfect circle. Then by leaving the gears of the same size and working the cranks of the two shafts on the same center, they obtain a diagonal motion in a straight line at an angle of 45 degrees. Between these limits, by changing the relative centers of the cranks, modifications or variations may be obtained between the complete circle and the line at an angle of 45 degrees, and by changing the relative size of the gears the compound movement between the figure 8 and that of the circle may be modified and varied. There are several minor details of

construction carried by the new patent, which go to still further improve this class of concentrators.

Academy of Sciences.

At the last meeting of the California Academy of Sciences, Ex-Governor George C. Perkins was proposed for life membership, and Carlton H. Clark, Wm. Churchill, George A. Johnson, J. W. Anderson, Miss M. S. Haggin, were elected resident members.

The president, Professor Davidson, read a written report of his observations of the annular solar eclipse of the 5th inst.; also a paper on the secular variation of the magnetic declination at San Francisco, which is referred to elsewhere in these columns. A very interesting paper by Lieut. John C. Cantwell, on the exploration of Kowack near Alaska, was read. Lieutenant Cantwell is attached to the United States revenue steamer Corwin, and the exploration, which extended to the lakes which form the source of the river, was made in July, 1885. The exploring party left the Corwin in the inlet into which the Kowack empties, and proceeded up the river with a steam launch and a skin boat—the latter being laden with supplies, instruments, etc., for the expedition. After encountering and overcoming obstacles and perils innumerable, Lieutenant Cantwell and a portion of the party, accompanied by Indians, who had been invaluable assistants, left the launch in charge of Mr. Townsend and another, at a point higher up the river than the farthest point reached by Lieutenant Stoney in the preceding year. They then continued their perilous journey with the skin boat, poling, dragging and lifting it over shoals, rapids and cataracts, until their eyes were gladdened by the sight of the clear blue water of the lakes which form the sources of the river. They had made an ascent of 500 miles in twelve days. The current of the river was very rapid—eight to ten knots—and it was with extreme difficulty that the trip was made. The mountains near by were covered with dense timber. The banks of the river in some places were composed of ice 15 feet thick. The party were annoyed by frequent very heavy rains, and also by clouds of mosquitoes. When the rain stopped, the thermometer went up to 94 and 96 degrees, a temperature few people would expect to find in Alaska, but common in the region described, in the summer. Lieut. Cantwell described his explorations in a very interesting and graphic manner.

Mining Accidents.

James Hocking lost his life at the Hyde mine, Tuolumne county, last week. The unfortunate man and his uncle, Thomas May, were working at the bottom of an incline when a boulder weighing about a ton became detached from near the mouth of the incline. The huge boulder in its deadly descent was not heard by the men working at the bottom of the incline, and no attempt was made by them to avoid it. James Hocking who had the misfortune of being the victim of this life-taking boulder, was struck on the head and instantly killed. Thomas May, though working but a few feet from his companion, miraculously escaped injury.

Lars Anderson, the miner who was caught by a cave in his mining claim on Weaver creek Trinity county, last week, has since died.

Captain Henry Trewella, a well known Comstock miner, was severely injured on Saturday last. He and some other miners were working on tribute work in the Hale and Norcross mine. Trewella was loading a drill hole in the face of the drill, using a wooden stamping rod when, from some unexplained cause, the charge exploded, the powder not being yet covered by any tamping material. The hole being about on a level with his head, the full force of the powder explosion took effect on the left side of his breast, shoulder and face, knocking him senseless for the time. His breast and face are badly burned, and the left eye completely destroyed, the left side of his head being also much lacerated by pieces of rock. His right hand is also terribly lacerated from the stamping rod, but fortunately no bones are broken, although the thumb was nearly torn off. Being nearly or quite sixty years old, nothing but a naturally strong constitution and skillful treatment can bring him out alive.

The French Government is at work on amendments to its mining laws.

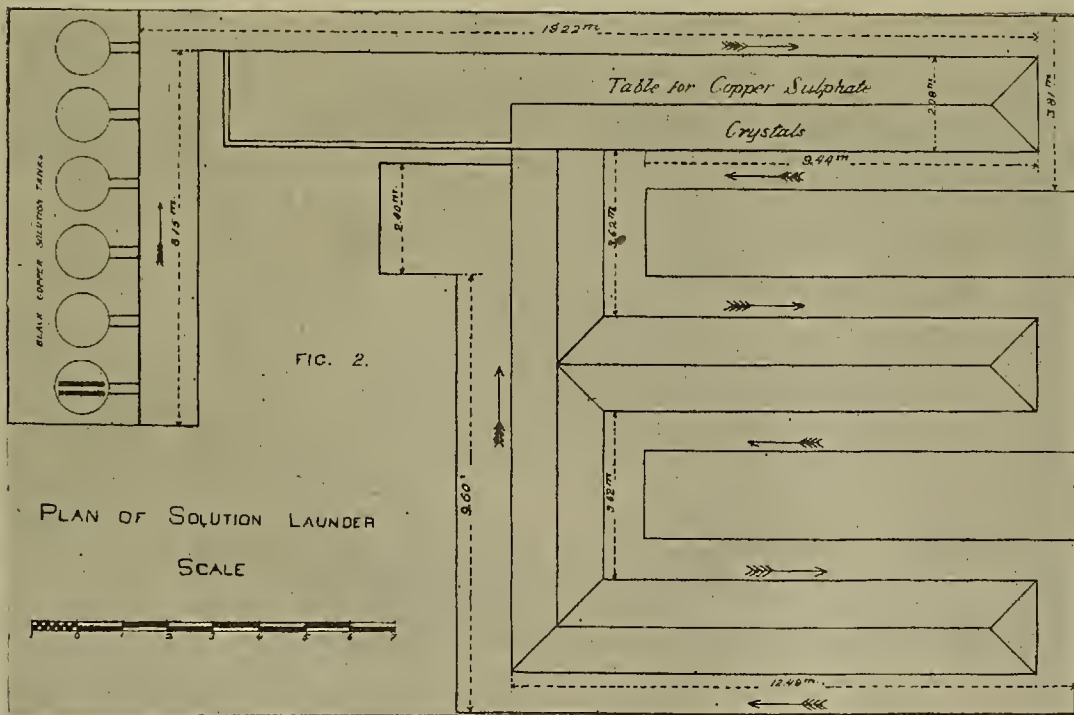


FIG. 2.

PLAN OF SOLUTION LAUNDER

SCALE

those taken from the different parts of the launders. In this way the residues are classified at once into rich or poor, pure or impure.

A GREAT many Chinese are flocking to the mines in the vicinity of Folsom: the old mining tailings worked over 30 years ago by the whites are being washed over again by the Chinese.

CERNUSCHI, the champion of bimetalism, says that monetary science has nothing to do with the strikes at the East.

motions for the end in view.

One of the shafts is arranged to give the side shake to the machine, and another shaft gives the end shake, by the aid of suitable mechanism. By the aid of suitable gears and cranks, the combination of these two movements acting simultaneously, enables the inventors, by variations of the crank centers and in the relative sizes of the gears, to produce variable and modified motions.

The gear or pinion on the end shake shaft is one half as large as that on the side shake shaft,

through a perfect circle. Then by leaving the gears of the same size and working the cranks of the two shafts on the same center, they obtain a diagonal motion in a straight line at an angle of 45 degrees. Between these limits, by changing the relative centers of the cranks, modifications or variations may be obtained between the complete circle and the line at an angle of 45 degrees, and by changing the relative size of the gears the compound movement between the figure 8 and that of the circle may be modified and varied. There are several minor details of

PRACTICAL HYDRAULICS.*

NUMBER 22. COPYRIGHTED.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

WITH RESPECT TO DISCHARGE.

One-half the square of side, $2.5 \times 2.5 \div 2 = 3.125$ square feet.

By Rule 51, $5.27 \times 3.125 = 16.47$ cubic feet.—*Ans.*

Or, by Rule 55, find, by Table 17, the discharge of a pipe 2.5 diameter, for the given fall, 25.87 cubic feet.

$25.87 \times .637 = 16.48$ cubic feet.—*Ans.*

Ex. 95.—The fall being 5.28 feet per mile, what will be the discharge of water flowing in a flume whose mean width is 8 feet, angle of side slope 45° , and coefficient of roughness, $n = .011$.

Cal.—By Table 17, for a fall of 5.28 feet per mile, and 8-foot pipe, the discharge per second is 350.5 cubic feet. Then by Rule 55,

$350.5 \times .586 = 205.39$ cubic feet.—*Ans.*

Remark.—With respect to the flow of water in pipes not differing largely in size, it may be assumed without material error in practice, that the velocities are proportionate to the respective diameters.

If greater accuracy be required, recourse to (133) will need be had.

Ex. 96.—The fall being 2.64 feet per mile, what is the discharge per second in a flume 9 feet wide, 4.5 feet deep, and the coefficient of roughness, $n = .011$?

Cal.—By Table 17, the velocities for a fall of 2.64 feet per mile, due pipes 8 and 10 feet diameter—mean $= \frac{8+10}{2} = 9$ feet—are 4.88, and 5.84 feet—mean $= \frac{4.88+5.84}{2} = 5.36$ feet, velocity per second.

Whence, $5.36 \times 9 \times 9 \div 2 = 217.08$ cubic feet.—*Ans.*
Kutter's Formula for the Flow of Water in Open Streams.

Among the most eminent experimentists in hydraulics, during the present half century, have been D'Arcy and Bazin, Humphreys and Abbot, and Kutter. Prior to this time, the science of hydraulics was largely speculative and incoherent. The older hydraulicians had determined on meager data certain laws which they erroneously held susceptible of general application.

D'Arcy and Bazin having collected a large amount of experimental data, deduced therefrom and published in 1835, a formula better adapted than any preceding for finding the flow of water in open streams and pipes of medium size. The report of Humphreys and Abbot on the "Physics and Hydraulics" of the Mississippi river, published in 1861, is very justly esteemed by engineers, first in importance, as to the extent, accuracy, and value of its contributions to experimental hydraulics. Their formulas, however, deduced from their experiments, besides being quite complex and tedious of application, give results too low for the flow of water in small and medium sized streams. Thus, between the formula of D'Arcy and Bazin, and those of Humphrey and Abbot, there existed a wide hiatus, till it was effectually closed up in 1870 by the introduction of Kutter's formula.

The mode in brief of Herr Kutter, in accomplishing this difficult and laborious task, is substantially as follows:

1st.—To divide the great mass of the observed and trustworthy results at his command, appertaining to the flow of water in open streams, into twelve classes, arranged as shown in Table 26, with reference to the degree of roughness of the stream-beds.

2d.—To adopt, on careful comparison of various formulas for the velocity of water under the imposed conditions, the following formula of Chezy as the basis:

$$v = c (r s)^{\frac{1}{2}}, \quad (251)$$

noting that c is variable.

3d.—For the determination of the values of c , that shall, when substituted with the given values of r , the hydraulic mean depth, and of s , the sine of slope in the Chezy formula (251), yield results respectively corresponding to those determined by observation, he makes extensive experiments with several trial formulas, among which is that of D'Arcy and Bazin, hitherto considered in our discussion of the flow of water in pipes.

Of these trial formulas, the following finally adopted is one devised by himself, which is not only

more simple in form than that of D'Arcy and Bazin, but yields results nearer in accord with those observed:

$$c = \frac{a'}{1 + \frac{b'}{r^{\frac{1}{2}}}} \quad (252)$$

This formula, however, is faulty, in that it is limited in application.

Thus by inversion, it is shown to be an equation to a straight line whose abscissa $= \frac{1}{r^{\frac{1}{2}}}$, whereas the plotted results of observation indicate a curve, and further show that a' is dependent upon the value of b' —in a word, that a' and b' are variables, and not constants, as at first assumed.

4th.—To generalize Eq. (252) the variable terms z for a' and x for b' are substituted in it; whence,

$$c = \frac{z}{1 + \frac{x}{r^{\frac{1}{2}}}} \quad (253)$$

5th.—"After much examination and further comparison," (Kutter's words) he puts,

$$z = a + \frac{l}{n}; \quad (254)$$

$$x = n z - l = a n. \quad (255)$$

Substituting these values of z and x in (253), we have

$$c = \frac{a + \frac{l}{n}}{1 + \frac{a n}{r^{\frac{1}{2}}}} \quad (256)$$

Equation (256) is found, however, not suited to the extremes of inclination of water surface, nor to the extreme limits of sectional area.

6th.—To meet these requirements, in other words, to render the formula applicable to all cases whatever, Kutter noting that "when $r = \infty$, c will $= z$, and the coefficients z will have their values represented by an hyperbolic curve," makes in Eq. (253),

$$z = A + \frac{m}{s}, \quad (257)$$

in which A denotes the semi-axis of an hyperbola, m the tangent of the inclination of its asymptotes with the axis of abscissa, and $\frac{1}{s}$ (s representing the sine of slope) the abscissa; whence,

$$z = a + \frac{l}{n} + \frac{m}{s}; \quad (258)$$

$$x = n z - l = \left\{ a + \frac{m}{s} \right\} n. \quad (259)$$

Substituting the values of z and x of Eqs. (258) and (259) in (253), there results the equation in its general form for the value of the coefficient c , viz:

$$c = \frac{a + \frac{l}{n} + \frac{m}{s}}{1 + \left\{ a + \frac{m}{s} \right\} \frac{n}{r^{\frac{1}{2}}}} \quad (260)$$

Substituting the value of c of Eq. (260) in (251), there results the general formula of Kutter for the velocity of water in open streams, viz:

$$v = \left\{ \frac{a + \frac{l}{n} + \frac{m}{s}}{1 + \left\{ a + \frac{m}{s} \right\} \frac{n}{r^{\frac{1}{2}}}} \right\} (r s)^{\frac{1}{2}}. \quad (261)$$

Combining (257) and (254),

$$A + \frac{m}{s} = a + \frac{l}{n}. \quad (262)$$

Making s infinite in Eq. (262),

$$A = a + \frac{l}{n}. \quad (263)$$

To determine the relation of c to n , in its simplest form, let

$$\frac{1}{r^{\frac{1}{2}}} = l, \quad (264)$$

in which $l = 1$, as found by trial.

Substituting this value of l , and of $\frac{1}{r^{\frac{1}{2}}}$ in Eq. (256), and reducing, we obtain the relation sought,

$$\frac{1}{c} = n, \quad (265)$$

which, as determined for the Mississippi river, is

$$n = \frac{1}{c} = .027. \quad (266)$$

The value of A in an hyperbola, coinciding with the curve formed by plotting observed results, is found to be:

$$A = 60. \quad (267)$$

Substituting the values of $A = 60$ of (267), $l = 1$ of (264), and $n = .027$ of (266) in (263), transposing and reducing,

$$a = A - \frac{n}{l} = 60 - 37 = 23. \quad (268)$$

To find the value of tangent m , let an extreme case be taken, in which the values, as determined from the plotted curve, are:

$$s = 0.00000363; \quad (269)$$

$$z = 487. \quad (270)$$

Substituting these values, together with that of $A = 60$ of (267) in (257), transposing and reducing,

$$m = (z - A)s = (487 - 60) \times 0.00000363 = 0.00155. \quad (271)$$

Substituting these constant values of $a = 23$ of (268), $l = 1$ of (264), and $m = 0.00155$ in (261), there results for metrical measures:

$$v = \left\{ \frac{23 + \frac{1}{n} + \frac{0.00155}{s}}{1 + \left(23 + \frac{0.00155}{s} \right) \frac{n}{r^{\frac{1}{2}}}} \right\} (r s)^{\frac{1}{2}}. \quad (272)$$

To reduce metrical measures employed in Eq. (272) to those of a different system, let e denote the ratio of the former to the latter, noting that n and s , representing ratios, are not affected by the reduction.

$$\text{Substitute } z = 23 + \frac{1}{n} + \frac{0.00155}{s}; \quad (273)$$

$$x = \left\{ 23 + \frac{0.00155}{s} \right\} n; \quad (274)$$

$$v = \left\{ \frac{z}{1 + \frac{x}{r^{\frac{1}{2}}}} \right\} (r s)^{\frac{1}{2}} = \left\{ \frac{r^{\frac{1}{2}} z}{r^{\frac{1}{2}} + x} \right\} (r s)^{\frac{1}{2}}. \quad (275)$$

Let z' , x' , r' and v' represent respectively the terms to which z , x , r and v , of the metrical system are to be reduced, then will $z = \frac{z'}{e}$, $x = \frac{x'}{e}$, $r = \frac{r'}{e}$ and $v = \frac{v'}{e}$.

Substituting these values of z , x , r and v in (275)

$$\frac{v'}{e} = \frac{r'^{\frac{1}{2}} z'}{e^{\frac{1}{2}} + \frac{x'}{e}} \left\{ \frac{e^{\frac{1}{2}}}{e^{\frac{1}{2}} + \frac{x'}{e}} \right\} \left(\frac{r'}{e} s \right)^{\frac{1}{2}}. \quad (276)$$

Multiplying in (276), both numerator and denominator within the parenthesis by $e^{\frac{1}{2}}$; also, multiplying both sides of the equation by e ,

$$v' = v e = r'^{\frac{1}{2}} \left\{ \frac{z'}{e^{\frac{1}{2}} + \frac{x'}{e}} \right\} r'^{\frac{1}{2}} s^{\frac{1}{2}} = \left\{ \frac{z'}{1 + \frac{x'}{e^{\frac{1}{2}} r'^{\frac{1}{2}}}} \right\} (r' s)^{\frac{1}{2}}. \quad (277)$$

Substituting the values of $\frac{z'}{e^{\frac{1}{2}}} = e^{\frac{1}{2}} z$, and $\frac{x'}{e^{\frac{1}{2}}} = e^{\frac{1}{2}} x$, in (277).

$$v' = \left\{ \frac{1 + \frac{e^{\frac{1}{2}} z}{e^{\frac{1}{2}}}}{1 + \frac{e^{\frac{1}{2}} x}{e^{\frac{1}{2}} r'^{\frac{1}{2}}}} \right\} (r' s)^{\frac{1}{2}}. \quad (278)$$

With respect to the Kutter formula, equation (278) is general for the reduction of the measures employed in it to those of another system. An inspection shows that by multiplying z and x , by $e^{\frac{1}{2}}$ (the square root of the ratio of the different measures), each term of the equation [1 (unit) being common,] will be the denomination sought.

To render the equation in terms of English feet, Let $e = 3.281$, the number of feet in a meter. (279)

Substituting the value of $e^{\frac{1}{2}} = 1.811$ in (278) after restoring the values of z and x of (273) and (274), and omitting the accents with respect to v' and r' ,

$$v = \left\{ \frac{41.6 + \frac{1.811}{n} + \frac{0.00281}{s}}{1 + \left\{ 41.6 + \frac{0.00281}{s} \right\} \frac{n}{r^{\frac{1}{2}}}} \right\} (r s)^{\frac{1}{2}}. \quad (280)$$

Equation (280) for the purposes of application may be somewhat simplified in the following manner.

Putting the numerator inclosed in brackets under the following form:

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Wholesale Charity Cheap!

EDITORS PRESS:—It is not always possible to be charitable without drawing on one's purse. I wish to point out to your readers a method of exercising their charity, which shall leave them not only happier in spirit, but shall tend ultimately to increase their store of this world's goods.

At a vast expense we endow hospitals, build orphan asylums, and establish refuges of various kinds, that our maimed and sick may be cured, our bereaved cared for, our incapables housed. Would that all these institutions were more capacious and more efficient! Would that the need for them were less!

But although we are thus charitable and tender to the unfortunate in our midst, while regarding them as individuals, we permit an institution for the wholesale manufacture of widows and orphans, of maimed and incurables. No human being can give one valid reason for the maintenance of this institution. No human being can point to any desirable end achieved by it, that could not have been more easily and better achieved without it. All affect to deplore its continuance among nations professing to be civilized, if not Christian.

The institution to which I refer is war. All our established charities are merely a futile attempt to eave at the spigot while war is waiting at the bung-hole. With incredible exertion and much parade a hospital is opened capable of receiving some hundred or two of patients; next week war breaks out and there are cases of mutilation in thousands, made gratuitously, wantonly, and unnecessarily. Surely if to bind up one man's wounds he charity, to assist in keeping 100,000 from wounds is much greater charity!

Public opinion can do this! American public opinion can do this! An individual can be deterred from flying at each other's throats, so nations can be deterred from mutual destruction. How, do you ask? Simply by law. An international Congress can be convened, backed by an international executive, competent to arbitrate all international disputes. Our society, the International Arbitration and Peace Federation is working for this end, and we want the help of every man and woman on this coast. Each has a share in the formation of public opinion and we want each to use their share, and to use it to its full extent. The president of our Federation is Rev. C. C. Stratton, president of the University of the Pacific, vice-president, Homer B. Sprague, president Mills' college and seminary. President Edward S. Holden of the University of California, also is a member of the Federation, so we have just ground to hope that young California will altogether be with us.

Ex-president Gen. R. B. Hayes also sends us his kindly greetings. He writes: "I am sure the march of events is with the cause of Peace, and of union between peoples."

I shall be glad to add to our list of members the names of all willing to assist this cheap and wholesale method of being charitable. We levy no assessments in cash, though any who want to help with cash can forward it to David Jacks, Esq., of Monterey, who has kindly consented to act as treasurer. What we want is a huge and irresistible contribution of public opinion. It needs quite a solid front of that to stand up against the vested interest of "blood and iron."

"Wut did God make us raytional creatures for, But Glory and Gunpowder, Thunder and Blood?"

EDWARD BERWICK.

Hon. Sec. I. A. and P. Federation.

Carmel Valley, Monterey, Cal.

EASTERN FISH COMING.—Professor Baird of the Fish Commission said he would send a carload of young fish to California to be placed in the waters there if the transportation could be arranged. Joseph Redding, whom Professor Baird has designated as agent of the commission in California, has raised \$1000 to pay the freight charges of the young fish to the Pacific Coast. The Commissioner has decided to send lobsters, which will probably be placed in the waters near Santa Barbara; eels, which will go to the sloughs in Sonoma, and fresh-water herring. Several deputies will take charge of the shipment and will see that the young fish are properly started in their career in the Pacific waters.

THE MOJAVE INDIANS at the Needles cremated the body of "Indian Charley" on last Saturday. Everything that belonged to the late lamented buck was also burned, except two horses, which the natives preferred to eat. It is the custom of the Mojave to burn everything and leave nothing for the widow and children.

THE STATE BOARD OF AGRICULTURE, at its recent meeting, passed a resolution inviting President Cleveland, through the Hon. Leland Stanford, in the name of the State Agricultural Society, to visit California, and to so arrange his trip as to be here during the annual State Fair of 1886.

THE first annual meeting of the California Museum Association was held at Sacramento last week. Total receipts for the year, \$7400; disbursements, \$5000. A collection is to be made during the coming year of all the imperishable products of the State.

USEFUL INFORMATION.

A WASHABLE WATER-PAIN.—Mr. Thomas Griffiths of London, the well-known inventor of the "Non-poisonous White," a substitute for white lead, which bears his name, is introducing to the trade a series of paints which can be made ready for use simply by the addition of cold water. The paint thus produced dries, it is stated, with a fine, hard surface, which, although mixed merely with water, is impervious to rain and uninjured by frequent washings, even with diluted disinfectants. As oil and turpentine are dispensed with, these paints are free from objectionable smell. They can be used for exterior work on wood as well as on brick, plaster, iron, or stone, and for interiors they are especially applicable to bedrooms, staircases, kitchens, etc. The paint can also be reduced by oil, which produces a hard, glossy surface. We should say that such non-poisonous and washable paints as these should find a ready sale in the colonies or in tropical countries generally, where cleanliness and freedom from infection are particularly requisite, but where the application of the ordinary oil-paints and distempers is neglected because of the elaborate processes and the skilled labor required. The convenient form in which Mr. Griffiths supplies the new paints, and the readiness with which a tin can be opened and closed, will prove important advantages in securing a market.—*London Iron.*

IMPROVED WATER-PROOF COVERING FOR ROOFS, ETC.—Wire gauze, preferably iron, is coated with a tough water-proof and elastic varnish or medium so as to cover the wire and close the meshes. The varnish or medium used is pure linseed oil, which has been previously oxidized and endowed with drying powers and thickened in a suitable manner. Wire-work so prepared is sufficiently transparent to admit light is waterproof and sun proof, comparatively inexpensive, and can easily be applied to the framework of a roofing or of windows, or used for such like purposes, and, as the improved material is not liable to be injured by unequal expansion or contraction between its component parts (a condition which does not exist in iron and glass roofs) it is especially applicable for roofing purposes. The material can be colored without affecting its transparency by the use of any of the well known transparent colors.

A CHINESE METHOD OF MAKING SHOVELS.—A Shanghai paper states that a novel branch of industry has recently sprung up at Chefoo. It is the manufacture of iron shovels. And we suppose our numerous readers could never guess what they are made of. They are made from old boiler tubes. Hundreds of men and boys are now engaged in this business. The old tubes are cut into short cylinders, just the length of the shovel, and then ripped open, flattened out and hammered into shape. Piles of these old boiler tubes may be seen everywhere in the back courts of the native Hong. Mule loads of these shovels are to be seen every day going into the country, and we learn that for one or two hundred miles in the country there is now scarcely a farmer that has not an iron shovel. The prices vary from 25 to 40 cents apiece, according to quality, thus bringing this useful implement within reach of all.

BEST PLANT FOR HOLDING BANKS.—The best plant at present known for consolidating, by the interlacing of its roots, the loose soil of a newly made embankment is, according to M. Cambier (of the French Railway Service), the double poppy. While the usual grasses and clovers need several months for the development of their comparatively feeble roots, the double poppy germinates in a few days, and in two weeks grows enough to give some protection to the slope, while at the end of three or four months the roots, which are ten or twelve inches long, are found to have interlaced so as to retain the earth far more firmly than those of any grass or grain. Though the plant is an annual, it sows itself after the first year, and with a little care the bank is always in good condition.

PARAFFINE AS A PRESERVATIVE FOR MARBLE.—Since the obelisk in Central Park, in New York City, was smeared with paraffine to prevent its disintegration from atmospheric changes the application of that substance to buildings of marble or stone as a preservative is becoming quite common. The latest example is the Exchange building, Broadway, which has been treated with acids over its entire front as a cleaning process. Mechanics are now going over the surface of every block, column, sill, and pediment with a sort of brazen blow pipe, from which three strong pencils of flame are projected against the marble for the purpose of heating it. This done, the paraffine is applied with a small brush. The buildings appear to be thoroughly renovated by this treatment.

HOT WATER BOILERS.—The cleaning out of kitchen boilers is seldom, if ever thought of. All sediment cocks should be left open at least once a week for the space of 15 minutes, so as to clean and wash out all foul sediment. Oftentimes when complaint is made that the water smells, or that it don't heat properly, the real cause will be found to arise from this neglect alone. In fact, people seem to go on

the plan that once in order, always in order. All plumbing fixtures require cleaning and looking after, just as much as the plate from which we eat.

THE NATURE OF COAL.—Some investigations made relative to the heat of combustion of stons coal have led to the conclusion by Meunier and others that during the formation of coal a certain quantity of heat must have been absorbed since the theoretical heat of combustion was always less than that actually observed. From want of knowledge, however, as to the real constitution of coal, it is regarded as impossible to determine the nature of this absorption. It is also a fact that, from want of knowledge as to the composition of coal, the heat of combustion cannot be calculated. It is well known that two coals of precisely the same chemical composition may and do afford very different degrees of heat in combustion.

SUNSHINE AND DRAUGHT IN CHIMNEYS.—The opinion is widely spread that the draught in chimneys is reduced by sunshine, and that the rays of the sun exert, as it were, a backward pressure on the smoke. Since Crooke's discovery of the mechanical work done by light, there seemed to be a chance of this view being correct, but after making a series of careful experiments, Hohlrausch has come to the conclusion that the rays of the sun do not press back the smoke. Probably the draught in chimneys is influenced by sunshine in the following way: The air around the chimney being heated, the difference of the temperature inside and outside the chimney, and consequently the draught is reduced.

RENOVATING GILT FRAMES.—This renovation applies to spots which have been formed, and for removal of which rubbing does not answer as being liable to loosen the gilt, or for general dullness. Apply with a camel-hair pencil a gum solution to which has been added gold brouze approaching the color of the frame. Before mixing with the gum water the brouze must be washed with water until it runs off perfectly clear. Repeat the application until the spots disappear. Then rub yellow wax slightly over a bristle brush and pass the latter softly with a dusting motion over the surface. Cover the frame until the wax has hardened to protect from dust.

THE MACHINERY OF GREAT BRITAIN.—It has been stated that "all the varied machinery of Great Britain, now operated by steam power, is capable of performing more work, and hence of creating more products, than could be produced by the labor of 400,000,000 able-bodied men, a greater number than all the able-bodied men on earth."

GOOD HEALTH.

Poison in Cheese.

It is well known that severe cases of poison have occurred from the eating of cheese. It has frequently happened in this country and cases have been known in Germany. It is a common expression among Americans who are effected by it that they have partaken of sick cheese. It is now well known that this effect is sometimes found in cheese of large dairies, although at one time, it was common to attribute it to cheese made on farms, in small quantities. The cheese made at a large factory in Ohio and Michigan convinced people that there were other causes than mere small makers, or inefficient ones for the existence of the poison. After long and patient investigation Prof. Vaughan of Michigan has given to the Board of Health of that State the valuable results of his investigations. Cats and dogs are not effected by it although they invariably choose the good cheese from the poor, when both are given to them to choose from. Possibly if a person tasted a cheese knowing that it was poisonous he might detect a sharpness of taste which would not ordinarily be noticed. But there is no certain means, aside from a chemical examination, by which a poisonous cheese can be distinguished from a wholesome one. The most trustworthy, ready method of examination is to press a slip of blue litmus paper against a freshly-cut surface of the cheese. If the paper is reddened instantly and intensely the cheese may be regarded with suspicion. When treated in this way any green cheese will reddens the litmus paper, but ordinarily the reddening will be produced slowly and will be slight. If the piece of cheese be dry it should be rubbed up with an equal volume of water, and the paper should be dipped in the water. Dr. Vaughan thinks that grocerymen should apply this test to every fresh cheese.

After a long and determined hunt the professor succeeded in isolating the poison, which will now pass into chemical science under the name of *tyrotoxin*. It is found to be a product of imperfect putrefaction in the cheese, and it occurs in the manufacturing vat, for the curd itself has been known to poison persons. Tyrotoxin appears in the form of needle-shaped crystals, which are freely soluble in water. The smallest visible fragments of a crystal placed upon the tongue caused a sharp, stinging pain and in a few minutes dryness and constriction of the throat. A slightly larger amount produced vomiting, nausea and diarrhoea. The isolated poison has a sharp pungent

odor, but in the cheese the taste and odor of the poison are both modified beyond recognition. The poison is volatile, and even poisonous cheese may be eaten after it is cooked.

The symptoms observed in cheese poisoning are similar to those caused by tyrotoxin, with the addition of head-ache, double vision, and marked nervous prostration. In rare instances the sufferer dies of colic.—*Hall's Journal of Health.*

Mortality and Occupations.

According to the *London Times* some interesting facts in connection with this subject appear in the supplement to the forty-fifth report of the registrar-general. It is shown that on the average the agriculturists have a comparative mortality figure of 644, the shop-keepers of 877, and the tailors, hatters, printers and book-binders of 1088. Living in a vitiated atmosphere seriously affects the respiratory organs. The mortality from diseases of these organs, and from phthisis, taken together, is 198 for the fishermen and 238 for the agriculturists, while for drapers and grocers 357, and for the tailors and printers 549. As drapers live in a more vitiated air than grocers, and printers than tailors, so the mortality in these several trades corresponds to the difference in each case. Arranging the various industries in the order of purity of air, the following are the averages of deaths from phthisis and diseases of the respiratory system: Fishermen, 198; agriculturists, 237; grocers, 283; drapers, 430; tailors, 471; printers, 627; chimney sweeps, 1519. The liability of chimney sweeps to malignant disease is about eight times as great as the average liability for all males.

Prof. Josef Korosi, the statistician, finds that the rich class average 52 years of life, the middle class averages 46 years one and one-tenth months of life, and the poor class averages 41 years seven months of life. From this it is obvious that the possession of wealth, and the resultant exemption from privation, lengthen the average life nearly ten years.

The *Popular Science News* asserts that the average length of life is constantly increasing, and the time may yet come when persons a hundred years old will excite no more curiosity than one of 80 years at the present time.

SCIATICA RELIEVED BY A SINGLE COCAINE INJECTION.—Dr. W. B. Menz, of Vidalia, La., writes that he was called to a lady, fifty-five years of age, who had been a constant sufferer from sciatica for ten years. The pain was very severe, and extended along the entire length of the nerve. She had run the whole gamut of anti-neuralgic remedies, and had never obtained anything more than very transitory relief. Having with him a vial of a four per cent solution of cocaine hydrochloric, Dr. Menz determined to try the efficacy of a subcutaneous injection. The hypodermic needle was inserted deeply over the sciatic foramen, and about twenty drops of the solution were passed into the tissues. The pain ceased almost immediately and during the six weeks that have since elapsed has not returned, although there has been no further treatment, and one injection only was practiced. The relief given by other remedies has never been of more than from two to four hours' duration.—*Medical Record.*

SCARLET FEVER.—After a room has been occupied by a scarlet fever patient all the articles, clothing, bedding, etc., that have been used about the patient, which can be washed, must be put into a tub with a disinfecting fluid. The following is good: Eight ounces of sulphate of zinc, one ounce of carbolic acid, and three gallons of water. Let them soak at least an hour, and then put them in boiling water for washing. Feather beds, pillows, mattresses, flannels and the carpet must be fumigated thoroughly. It is well to have the side walls and ceilings cleaned and whitewashed, and the wood-work and floors thoroughly scrubbed with soap and water. If the walls are papered, it should be taken off and the room repapered. It would be better to take up the carpet and carry away all useless things from the sick room at once, if possible. It is said by physicians that the infection can be conveyed by both books and papers, and it is certain that it can be carried by clothing.

DIABETICS.—Contrary to the general practice followed, Dr. Boucheron, in a note to the Academy of Sciences, advises diabetics to abstain from aluminoid food and alcohol, as well as from hydrocarbonized food. By this means, according to him, the sugar will disappear in three or four months. The brouimia and polydipsia are the first symptoms to give way, and strength will return with the general improvement.

THE OYSTER UNDER THE MICROSCOPE.—M. Cortes, the distinguished microscopist, has been experimenting upon the various condiments on the tissues of the oyster. He recommends lemon juice as the most valuable of these relishes, as it has the property of destroying the animalcule which infest the stomach of that mollusk.

A HEALTHY SOCIETY.—It would seem that Nutfield, in Surrey County, England, is the most healthy spot in the world, as the rector has announced that, with a population of 1200, only one man died last year, and he was 88 years old.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MOORE.—Amador Ledger, Mar. 13: The first regular cleanup of this mill was made on the 9th, and the result exceeded expectations. The run has averaged about \$10 per ton, a very flattering output, as a good deal of gouge and slate was passed through the mill. This practically settles the question of the paying nature of the Moore lode. We understand there is plenty of ore in sight, but it is expected that sinking will be resumed soon, and perhaps the other compartment of the shaft will be carried down so as to enable the mill to be kept going while the shaft is being deepened.

MISCELLANEOUS.—The St. Julian Mining Co. have levied an assessment of one and one-fifth of a cent per share. As there are 100,000 shares the assessment will amount to \$1200. The sum is required to pay for the tunnel which has been run several hundred feet during the past year. Nothing is being done at the mine at present, and work is not likely to be resumed until the assessment is collected and the indebtedness wiped out. The Bechtel mill at Angels was started last week and works charmingly. It is reported to be the most completely equipped 20-stamp mill in the State. The Kennedy is drained of water. The shaft and tunnels are found to be in excellent condition and very little repairing will be needed. Preparations are being made to commence sinking as soon as possible.

SUTTER CREEK.—The new wooden wheel to take the place of the cast-iron driving pulley which broke two weeks ago at the Mahoney mine is completed and in place. Owing to the recent storm, however, the company have decided to defer operations until there is a reasonable certainty of fair weather and uninterrupted work. The condition of the roads has brought all wood hauling to a standstill. The 30 stamps of the Lincoln are kept running steadily and everything about the mine wears a prosperous look. Mr. Stewart is cleaning up this week. There is nothing new to report in connection with the Eureka. Drifting is still in progress, with no new developments. Knight & Co. have just finished two large skips for the Gover mine. Their capacity is 560 gallons each and weight 2100 pounds. They will be taken to the mine in a few days.

Calaveras.

SHEEP RANCH.—Cor. Calaveras Citizen, Mar. 8: New excitement has recently been inaugurated here from reports from a mine recently bonded by Peter Davis near Bunta's gulch or Ide and Terwilliger's gravel claim. The bond was made to San Francisco parties, and the work has been superintended by Joseph Marshall, an old prospector of repute. He has been working but a short time and has found some very rich rock which he has exhibited in town. This is considered to be the most favorable prospect for the development of a good mine in this section.

El Dorado.

GRIZZLY FLAT.—Cor. El Dorado Republican, Mar. 13: There seems to be some stir and excitement south of town on the line. At the Old Independence mine, east of Mendon, some new and very valuable developments have been made which promise to make that old mine better than ever before. Some Eastern gentlemen are putting machinery on the Parker mine. It is reported that they have some very good ore and that they will put in a style of machinery for the reduction of the ore, from which a success is confidently expected.

NEW MILL.—Georgetown Gazette, Mar. 13: Having tested the value of the ore in the Robert Burnham mine, with a small two-stamp mill, to their satisfaction, Mr. McKinley has gone to S. F. for the purpose of procuring as we understand one of Huntington's new patent roller mills which are said to be superior to stamps for the soft material of which their lode is composed.

Nevada.

THE ALLISON RANCH MINE.—Grass Valley Union, March 13: Mr. Malleville, who is a representative of the party which has been negotiating for the purchase of the Allison Ranch mine, informs the Union, that the money is now ready to pay for the property, and that an engineer is on the way from France to perfect all the necessary arrangements for starting the work on the mine. This seems to conclude the question as to whether the French company would finally secure this old mining property, upon which they obtained a bond last season, and upon which several extensions of time were given. The purchase price is generally understood to be \$60,000. As to the value of this property there is a general unanimity of opinion among the old miners here, who were familiar with it in the days of its former profitable operation, that its treasures are only partially exhausted, although it has produced \$3,250,000. The main incline shaft is down 700 feet, which is but a superficial depth as compared to several other mines in the district which are being worked much deeper and are paying well. The mine contains much virgin ground, which will give many profitable working years under intelligent management and the improvements which have been made in quartz mining since the mine has lain idle. No doubt is felt that the Allison Ranch will again make its mark as one of the great gold producers of the State.

RICH STRIKE.—Nevada Transcript, Mar. 13: About six months ago while Messrs. Robinson, Battey & Curry were running a drain tunnel at their Ella mine on Rush creek, four miles west of town, they encountered a chute of ore heavily sulphuretted and rich in free gold. Since that time they have put the property in shape for extensive and systematic working, and are now engaged in developing the deposit. They find it to be quite large and in every way more valuable than their preliminary observations had led them to think it was. Within the next week or two crushing will begin regularly, and there is every indication that the results will be highly profitable. This mine has been opened in the face of that most serious obstacle, a lack of working capital. A long bed-rock tunnel has been run, hoisting and milling machinery has been erected and a shaft has been sunk to a depth of 900 feet. Heretofore there has been no attempt at deep

mining in that part of the township, none of the explorations extending more than about 30 feet below the surface, and yet thousands of dollars have been realized by the desultory workings of the numerous ledges that abound there.

FREE GOLD.—Grass Valley Union, Mar. 13: The 1300-level of the New York Hill mine, 200 feet north of the shaft, is showing a 12-inch ledge which carries well in free gold. Gold-bearing stringers are found making into the ledge. The south drift on the 1200 level is also being driven on a good ledge. The underground force of the mine numbers about 100 men, 60 of whom are on the regular payroll and the remainder working on tribute. The North Star mine is doing well and working a large force of men. The ledge at the bottom of the shaft is yielding high grade ore.

Placer.

DUTCH FLAT.—Placer Republican, March 13: The Alta gravel mine situated at Alta, started up today. This mine has been lying idle for some time owing to the machinery not being heavy enough to do the required hoisting, but the mine is now supplied with new and extensive machinery, and will be run night and day. It is under the management of Robert Rahut, an experienced miner of Virginia City. None but white men will be employed, which speaks well as a starter for the enterprise.

Plumas.

CRESCENT.—Cor. Greenville Bulletin, March 13: The Green Mountain mine is running with a full force of men, and perhaps in its whole history never in a more prosperous condition than now. I hear that the mill at Dixie will be fitted up in a few days to run through a lot of rock taken out by Alsop and Wing near the old Bachelard and Ellis Wing mine. I hear that the rock is very fine.

San Bernardino.

FIVE POINT DISTRICT.—Calico Print, March 13: On the 23rd of last month Messrs. Evans, Sullivan, Clark and Hart shipped a carload of ore from the Jim Blaine mine of that district, to Kingman, being the first ore shipped from that district. They will continue shipping ore if the milling results favorably. These gentlemen have four or five men at work on the mine sinking a shaft, which is now down to a depth of 45 feet. The ore in the shaft shows favorably and they expect to realize a snug sum from it. Mr. Evans informs us that a fine body of ore was struck in the Plueth mine in Five Point district.

LAID OFF.—Calico Print, March 13: A number of men have been laid off from the force of the King mine during the week. This is probably in consequence of a desire on the part of the management to give the mine a rest, or rather to let up hitting it so hard for a while. The consequent diminishment of the ore supply will not prevent the mill from working full time, as the working force of the Waterloo will be sufficiently increased to keep up its crushing capacity.

THE EXPIRATION OF BARBER'S LEASE on the Red Jacket has thrown twenty or thirty men out of employment, and has had an effect of depression on the business outlook. Mr. Barber leased the claim when there was nothing in sight, and by strict attention to business and careful application of the knowledge which years of experience have given him he developed a mine where before there was but a prospect. We wish his lease had lasted 19 years longer, for both his own and the town's sake.

PROSPECTING.—A large number of men are scouring the adjacent hills in search of prospects on which to chloride. Several who got the worst of it in the recent drafts from the King and Red Jacket mines, have sought other climes, but those remaining here are not of the kind to sit contentedly until something "turns up."

San Diego.

JULIAN AND MESA GRANDE.—Cor. Calico Print, Mar. 13: The Stonewall is running right along with a full force. Mill hammering day and night, ledge runs from four to thirty feet wide, and ore from \$12 to \$50, average about \$20. Some 60 men are employed. Owens working away on a four to five foot ledge of good ore. Hoisting works are up and pumps running. A twenty-stamp mill is to be erected in the spring. Old Owens is being worked but little; is waiting for spring and the mill. There is plenty of rich ore in sight; both of these claims have applied for patents. The Ella was bonded for \$6000 and is working well on three feet of good ore, and a sale of the same is about to be consummated. There is a splendid showing here for a first-class mine. The City of Richmond consists of two ledges, one of base and the other of free milling ore, and is being worked steadily and from present indications promises to become the best in the camp. Sandeman & Co. have taken out about 20 tons of \$40 ore which is ready to be milled, but as there is no mill within reach they are waiting until the Owens mill is built. The Hubbard is looking well in both mill and mine and a rich strike has been made in the mine. The Ready Relief is the old standby yet. It kept running when everything else shut down and it showed what could be done by economy and attention, and always pays. The Charlot is liable to start work soon; if they find the ledge below the break they will have a big bonanza. It is about time that the Helvetia was being looked after. Here is a fine property lying idle just because she broke one company who worked her on an extravagant plan. The Shenandoah is hammering away day and night and is turning out finely. It has plenty of good ore and about 18 men at work. The ore averages about \$30 per ton. Red Hill is a little darling. At 50 feet she shows two feet, solid, of a red quartz plentifully sprinkled with free gold. The owners are confident of developing a good mine.

Shasta.

QUARTZ MINING.—Shasta Co. Democrat, March 10: About 80 men are now employed at Iron Mountain. Nearly all the milling machinery for the Cresus mine on Squaw creek is on the ground. Peter Schearer has resumed work on the Tellurium mine. Jim Hall is engaged timbering the west drift. Ebersole and Habich of Newtown have leased the Dan O'Neal mill on Star gulch and are running it on good ore. We are informed that Wm. T. Coleman has bought a mine situated a short distance west of Shasta, paying \$3000 for the property. Lem Williams of Copper City was in town Monday. He says the Winthrop Company are talking of increasing the capacity of their mill. Carson & Snyder of Squaw creek are now crosscutting their vein, showing up a fine body of rich ore. Frank Davis of the

Clipper mine is still running the tunnel and the rock is showing up huge in free gold. Mr. Frick, a miner formerly of Deadwood, recently made a very rich gold quartz discovery between Lower springs and Middle creek, in which our townsmen John Major and Seldon Meade, are interested. Excepting the Schearer tellurium, it is about the richest rock in the county. The vein is about 10 inches thick, and the rock is perfectly lousy with the "yaller truck." A shaft has been sunk 15 feet in depth, and the pay ore seems to improve. Sufficient work has not yet been performed to tell how extensive the pay chute may be. Last week 600 pounds of the rock was brought to town and left at De Forrest's sampling works to be milled. Two rich silver discoveries are reported to have been made last week, the one on Dog creek near Delta and another on Shotgun creek above Portuguese flat. We failed to learn particulars. Since putting the above in type we have heard the following in regard to the Dog creek strike. It was made by a miner named Noonan, and two others are interested with him. The discovery is on McCall gulch, a tributary of Dog creek, about three and a half miles west of Delta. The vein is a little over one foot wide, and much of the ore is enormously rich in gold and native silver. They have sunk 10 feet on it and at that depth native silver is dug up with pick and shovel and small chunks of free gold are occasionally loosened. They have already realized over \$2000 from the strike.

Trinity.

LOOKING WELL.—Trinity Journal, March 13: The Thanksgiving mine, on Barney gulch, in East Fork district, Mr. Bailey, one of the owners, says is looking remarkably well. The tunnel is now in a distance of 130 feet and two ledges, running parallel with each other, have been encountered, both assuming encouraging prospects the rock prospecting in the neighborhood of \$50 per ton. Mr. Bailey is of the opinion that about the 1st of June the mine will be thoroughly prospected and himself and partner amply rewarded for their labors in the shape of a good paying property.

COMMENCED OPERATIONS.—Thomas, Luke, and Barney McDonald, of Deadwood, were here the first of this week en route to East Fork mining district. Mr. Barney McDonald will have charge of operations at the Lone Jack and Enterprise quartz mines in which his two brothers have of late become largely interested. Operations were commenced this week and work will be pushed ahead vigorously, and the arastra will be kept moving. We understand that if sufficient encouragement is found the arastra process will be abolished and a stamp mill erected. They have the capital. East Fork will yet be a bonanza camp.

RICH STRIKE.—We were shown some rock this week which came from the Rich Gulch quartz mine in East Fork mining district, that for richness eclipses anything heretofore brought to light in quartz mining in Trinity county. In fact, we might venture to assert without fear of contradiction, that it will rival, if not outrival, any find yet chronicled in the quartz regions of Northern Cal. The possessors of this valuable property are John Sheehy, (formerly of Eureka, Humboldt county,) Chas. Abbott and Dan Griffith. The ledge is three feet in width, with this rich seam several inches wide, running through it. It is, of course, not yet known how extensive or how much of the "yellow truck" is there, but we have been authentically informed that there is enough in sight to more than convince the owners that they are on the eve of becoming capitalists. The company have an arastra which has been running for the past month steadily on good paying rock, but now that this rich strike has been made they will turn out the bullion in enormous quantities.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, March 13: Drifting southward from the station at the 3200 level of the deep winze is well commenced to make connection eventually with the Combination shaft, which is to be sunk to that level shortly, but for obvious reasons the drift cannot be run to good advantage until the shaft reaches that level. The good ore found in upraising above the 3100 level, mentioned last week, has been followed upward over 40 feet, and is being stoped out and stored in the drifts. The upraise in the ore body above the 3000 level is now up about 100 feet, and will soon reach its objective point of connection with the 2900 level. The ore being removed in this upraise is also being stored in the drifts, to be raised to the surface for milling when it can be done to advantage through the Combination shaft. The diamond drill has been and still is being used in explorations from the north end of the north lateral drift on the 3100 level. A series of bores 50 or 60 feet or more in length have been driven in sundry directions toward the Savage mine and penetrating past the line, studying the best point for advancing the drift in the driest and most advantageous formation, the idea being to avoid, if possible, any strong flow of water from that direction. The drill shows good ore prospects.

CHOLLAR.—The report that crosscutting the heavy ore vein developed on the 3100 level was to be commenced forthwith was premature, there being no present intention in that line, as work is being concentrated on the drift into Potosi ground. Sinking the Combination shaft will probably be resumed next week, carrying it to the 3200 level, where it will eventually connect with a drift from the Hale and Norcross deep winze on the same level. The shaft is 3155 feet deep at present, and everything is in readiness for sinking deeper as soon as the order is received.

CON, CALIFORNIA AND VIRGINIA.—The broken main line shaft of the Eureka mill being repaired, the mill started into full operation again day before yesterday, and the mine is in full work again, ore shipping being resumed yesterday. On the 1650 level the drift northwest has reached its objective point of connection with the old bonanza ore stopes and workings, where there is much good ore left for extraction. On the 1400 level the drift southwest is in 332 feet, well timbered throughout.

BEST AND BELCHER.—The connection with the third line of pumps at the 2128 level facilitates the drainage work, but owing to the great amount of ground and openings to be drained, the water has been but little reduced in the shaft since last week's report. About 200 feet of water remains to be pumped out before the bottom of the shaft is reached. The shaft is just 2379 feet deep from the collar or

surface to the bottom, which corresponds with the 2500 level of the C. and C. shaft.

OPHIR.—On the 300 level the west drift from the old Mexican shaft is in 275 feet—material vein porphyry, with streaks of fair grade ore. On the 400 level the north drift is in 288 feet, showing no change of interest since last report. On the 700 level the joint Mexican and Union drift, running north-west from the Ophir shaft through the Ophir ground is in about 460 feet, and has passed through into Mexican ground. Good developments may be looked for shortly.

SIERRA NEVADA.—Running the main lateral drift north on the 520 level has been discontinued, the formation not being encouraging, and a crosscut east is being run about 120 feet back from the face of the drift, at a favorable looking point. This is now in 176 feet, and has cut through a clay wall, four feet thick, into a very promising formation of vein porphyry and quartz.

KENTUCK.—Daily yield about 45 tons which is reduced at the Rock Point mill exclusively. A special meeting of the company is to be held at San Francisco, next Tuesday to receive the report of the superintendent on the present condition of the mine, and to decide as to its future working.

POTOSI.—On the 3100 level the main south lateral drift from the 3100 level of the Chollar continues its excellent rate of progress, being in about 60 feet from the Chollar line, following the footwall or west side of the ore vein. The ground is dry and favorable.

GOULD AND CURRY.—Good work is being done clearing out and retimbering the old openings on the 600 level, 52 feet of the main south drift having been reclaimed during the week. Fifteen men are employed.

CROWN POINT AND BELCHER.—The 1700 and 1600 levels and the stopes between are yielding some very good ore, but the principal amount of the daily product, about 350 tons, comes from the old upper workings.

MEXICAN.—East crosscut No. 2, on the 500 level is in 230 feet from the main north lateral drift, Material vein porphyry, with streaks of clay and quartz.

UNION CON.—On the 500 level north lateral drift No. 2 has been extended 39 feet, making a total length of 231 feet. No change in material—vein porphyry.

ALTA.—On the 700 level the main lateral drift north has reached within about 80 feet of the Benton ground. Material vein porphyry.

YELLOW JACKET.—About 130 tons per day is the average yield from the old ore stopes, which is reduced at the Brunswick mill.

JUSTICE.—Considerable exploration work is being done on the 350 level at the south end.

Aurora District.

THE ESMERALDA MINES.—Cor. Alta, March 12: The mining outlook in Esmeralda county is better than it has been since the booming days of Aurora, when the Wide West and Real del Monte stock brought the high Comstock figures, and when poor men were suddenly raised to millionaires. Sleepy old Aurora, the streets of which for years were deserted, has awakened and taken on new life. An English company has invested largely in the mines in and near Esmeralda's old county seat, and preparations are being made to work several of the lodes there on an extensive scale. That camp at one time showed some of the richest silver-bearing ore ever worked in Nevada. The Mount Corey, near Hawthorne, the present county seat of Esmeralda, is not being worked at present, but operations will probably be resumed in this fine mining property during the present season. The Mount Corey, owned by James C. Flood, has splendid reduction works on it, which cost upwards of \$300,000, and the leaching process was successfully used in treating the ores. The Lapanta mine, about ten miles from Hawthorne in an easterly direction, was recently purchased by an English company for \$450,000, and will be systematically worked. The Alta's informant stated that during the last six months English capitalists have invested \$200,000 in mining property in Esmeralda county.

Como District.

STOPING.—Virginia Enterprise, Mar. 12: John J. Hepworth was over from Como yesterday. He says they have sunk an air shaft on the North Rapidan ground, a short distance north of the main working shaft, and connected with it from the 160 level, giving good and much-needed ventilation. They have resumed stoping out ore, and will accumulate it on the dump until the roads get good again, when the ore will be hauled to the Rock Point or some other mill on Carson river for another run. The Symons boys are industriously working their Como-Eureka mine and getting out some pretty good ore. Considerable snow fell in Como during the last storm, yet the weather has not been severe enough to interrupt work to any appreciable extent.

AIR CONNECTION.—Lyon Co. Times, March 13: The air connection was made this week in the North Rapidan mine in Como. It has been quite an undertaking for the company to perform this work, as the bad air has allowed but one or two men to work in the mine at a time. It is understood that in a few days a force of six or eight men will be put to work to take out the rich rock that was struck some months ago. By the time the road, which is now being fixed, is in complete repair, another lot of ore will be ready for shipment.

Eureka District.

THE EUREKA CON. AND RICHMOND.—Eureka Sentinel, Mar. 13: But little is heard about town nowadays of the mining operations of the Eureka Con. and Richmond companies. According to street rumors, a station is being excavated on the fourth level of the first named property to accommodate a diamond drill, which will be used to prospect a block of ground in that locality. Some 60 tributaries are working in the mine. At the company's reduction works upwards of 1,500 tons of ore have collected, and report has it that the furnaces will start up again about the 1st of April—probably before. Some four weeks ago, most of the miners in the Richmond were laid off until certain necessary repairs were made to the machinery of the hoisting works and in the shaft of the mine. The repairs were completed a week ago, and the miners resumed work. Many of them are tributaries and are said to be doing well. Considerable ore has already collected at the company's reduction works,

and there is a probability the furnaces will again be fired up within 30 days.

Garfield District.

SILVER.—Lyon Co. *Time*, March 13: About 600 pounds of very high grade silver rock from the Hindley mine, Garfield district, was received here last Saturday. The rock is very fine, and assays \$2,451.63 per ton. The ledge from which it is taken is now about 18 inches wide. The Hindley is owned by C. H. Ruli-on, G. W. Likens, W. W. Byron, Harry Cobb, G. C. Fish and other parties in Dayton, and is an extension of the Great Western mine which is owned by Archie Farrington. The strike has caused considerable excitement in Garfield district. The 600 pounds of rock were sent to the Selby Smelting Company of California.

Pioche District.

CHLORIDING.—Pioche *Record*, Mar. 13: The different men who have worked in the Mendham mine chloriding have all made good wages. We learned from Barney Cronin the Grant Porter crowd averaged about \$6 a day, after paying one-third to the company. Cronin and his partner, while they chlorided there, made \$5 per day. Now Pete McKee and partner are there. The men cannot work in the Mendham ore-body any length of time, without getting leaded. All of the men who worked there of late received a severe dose of lead, and gave it up in disgust. When the company ran the mine they employed nearly a double set of miners; one-half of them generally being leaded.

Tuscarora District.

GRAND PRIZE.—*Times-Review*, Mar. 8: The stamps at the Grand Prize having finished crushing the ore on hand, were hung up Saturday evening, and the cleanup will probably be completed to-day. Stoppers will be kept at work in the mine, and another run will doubtless be made in the course of a few weeks.

ARIZONA.

A CHANCE FOR PROSPECTORS.—Yuma *Sentinel*, Mar. 8: Between Silver district and old Eureka district this country is a belt of country, in every gulch and wash of which is found float lead running high in silver. The ledges from which this float comes are blind, but the country is so open that careful prospecting cannot fail to uncover the lodes. It is the softest and prettiest chance for skilled prospectors with a little grub stake to make a raise. At the present price paid for lead and silver averaging 40 ozs. per ton, facilities for shipping \$11 per ton to San Francisco, delivery of water at \$1 per barrel and supplies at reasonable rates from the local store of J. Detelbach, through whom ore could be shipped—it discounts wages with less hours, and the mines are certainly there.

TOMSTONE.—*Democrat*, March 8: Work on the Grand Central pump rods has not yet been commenced; but when the coupling plates arrive, which will be in a few days, the rods will be trimmed into shape and placed in position. It will require about 30 days after the plates arrive before the pumps will again be in working order. The most noticeable fact in making a tour of the district is the cheerful view of the future which seems to be shared by all interested parties. Everybody, from the holder of an undeveloped claim to the possessor of the hill bonanzas, seems to be imbued with this feeling. Of course, the result is perceptible on every hand, additional men are daily put to work, and scores of properties which have for years attracted little or no attention are now being tested for the first time.

TOMSTONE MILL AND MINING COMPANY.—The regular product of 2,000 tons monthly is still being reduced at the Girard mill and the Charleston smelter and concentrators. This handsome output is mainly taken from the 200 and 300 levels of the Toughnut. This mine, one of the first located in the camp, has proven also to be one of the best. With the possible exception of the Contention, it has produced more bullion than any other single location in the district.

GRAND CENTRAL.—Forty tons daily are being raised from above the 400 level. The mill is running day and night, and but for the extra expense in making preparations to control the water the Grand Central would be paying its old-time monthly dividends. There is not a share of stock for sale, and the owners were never so hopeful and confident as at present.

CONTENTION.—The ore body on the 600-level is being worked and about 30 tons raised daily. The ore from this level carries a much higher percentage of gold than any other body heretofore encountered in the mine. As soon as the pumps are started work below the 600-level will be pushed vigorously.

VIZINA.—Under the energetic superintendency of Captain Taylor, this reliable producer is bidding fair to regain its old-time place in the rank of paying Tomstone properties. Eighteen men are now employed, twelve of whom hold leases on portions of the underground workings.

PERSEVERANCE.—This mine was spoken of last week as the Lillian. The rich strike mentioned last week increases in richness under development. The vein has an average width of three feet at a depth of 50 feet.

STATE OF MAINE.—Work on the 500 level is being pushed. Several rich pockets were struck during the past week. For the month the usual shipment of forty tons has been increased to sixty.

EMERALD.—On the 600-level of this property a strike of considerable magnitude was made this week.

COLORADO.

RUBY DISTRICT.—Elk Mt. *Pilot*, March 8: We must not lose sight of the fact that Irwin, the Ruby mining district is probably the best mineral producing district in the country. At least the quantity and quality of the ore will prove that. During the month of February there was shipped about 95 tons of ore which is valued at not less than \$15,000. To produce this amount of ore it required the labor of about sixty men. The pay roll for these sixty men would be about \$5,000 for the month, so that in round numbers one can see that Irwin is self-sustaining before paying a handsome profit, which can be said of no other camp in the country. Of the hundreds of prospects located and worked a few years ago there are only three mines in the district that are working

and making a reputation for themselves. The Forest Queen is working about thirty men and shipped last month 55 tons of ore. The Bullion King is working about twenty men and shipped last month twenty tons of ore. The Ruby Chief, which has recently developed a rich streak in the vein, is only working five men and shipped twenty tons of ore. Either one of these mines is sufficiently developed to give employment to not less than fifty men, but the managers, all of whom are good, practical men, profiting by the experience of others, prefer to be more cautious, and work the property after a fashion of their own. There are other properties that might be made just as valuable if they were vigorously worked. The owners of the Hopewell are pushing work on this property and they will some day have just as good a property as the Ruby Chief, from the fact that it is the same vein. The St. Johnstown lode is situated on the hill south of Coal creek, and back of where Eckerly's mill used to stand. Pat Connelly is working this property and he has pretty good assurance of a good mine some day. It is believed to be the same vein as the Fairview, as it runs in that direction, and the character of the rock is identical to that of the Fairview. The Gunnison smelter has started operation, and has a capacity of about fifty tons per day. Mr. Lawrence is getting much of his ore supply from Aspen, which is being hauled to Crested Butte and loaded on the cars.

IDAHO.

WOOD RIVER.—Salt Lake *Tribune*, Mar. 13: Mr. G. A. McCornick, banker of Bellevue, Idaho, is in the city on his way East. In a conversation with Mr. McCornick a *Tribune* reporter learned some Wood River items of interest. The town of Bellevue, he believes, has a bright future, and in support of this he says: "Our monthly payroll is over \$20,000. The Queen of the Hills is working over one hundred men, and is showing well, the ore output being ready and shipments regular. The Minnie Moore is working fifty men, and is under the new management, developing again into a big property. Up at the head of that gulch, the mines belonging to Mr. Callahan promise to become a great property. The Lark a short distance below Bellevue, is looking well, and has turned out in simple development work, forty to fifty tons of good ore. As soon as Mr. Miller returns from Europe in May or June, machinery will be placed on this property." "Have there been any other new properties opened up this winter?" was asked. "Yes, you know that on the east side of Bellevue but little has been done. Messrs. Plughoff and Longbottom have opened a ledge there which yields 160 ounce silver ore. Their first shipment brought them \$2800. We had a splendid winter, the snow falling to a depth of two and a half feet and lying on all the season. It is now between Bellevue and Hailey, about one and a half feet. Between Broadford and the Bellevue depot the snow has been worn out in hauling ore and wagons are now used."

SNAKE RIVER PLACERS.—Ketchum *Keystone*, March 8: Considerable interest has been awakened lately in placer mining along Snake River. Parties have taken up 1,000 acres of ground, and a move is being made to incorporate a company for the purpose of working the ground. The majority of the miners along the river are not inclined to the theory that the fine gold originally came from the headwaters of the Snake, but from the extensive lava fields. Pay dirt is found away back from the river, high up on the plateau, among the sagebrush, where it would seem from indication that the river never once flowed. The gold is saved by the improved burlap machine, the average size of which is 6x24 feet.

MONTANA.

ENCOURAGING.—Butte *Inter-Mountain*, March 8: This week has been an encouraging one among the mines. Several prominent ones have shown a marked improvement in their latest developments, and in others necessary dead work has been completed which unlocks ore bodies heretofore unavailable. Several leases that have been worked in a small way have changed hands and will in the future be developed more extensively. There are a number of sales on the point of being consummated. All the silver mills are fully supplied with ore, and with the exception of the Montana Copper company all the smelters are running as usual. At the Alice, work is being done on all the levels from the 100 to the 800 foot, inclusive, and more ore is being produced from each. At the 900-foot the station is being cut out by Ingersoll drills, and the shaft will be sunk to the 1,000-foot station as soon as possible. Thus far this mine has held its own as depth has been gained. The ore in the 800-foot level compares favorably both in quality and quantity with that nearer the surface. The new air compressor is working to perfection. At the Magna Charta work is also being done on all the levels to a depth of 700 feet, the present depth of the shaft. The mine is looking well and producing its usual quantity of ore. On the Curry the company are drifting west on the 100-foot level. The vein is looking fairly and carries about 18 inches of ore. At the Valdemere they are stopping above the 118-foot level and are taking out an argenteriferous manganese ore which when mixed with the baser ore aids chloridizing them. These four mines—the Alice, Magna Charta, Curry, and Valdemere—are owned and worked by the Alice Co., and produce daily 300 tons of ore. At the mines and mills 340 men are employed. The Moulton has its pump running at the 700 foot station. It is working perfectly. Cross-cuts will be begun at this point within a few days. Work is being done on the 500-foot level and on all the others above it. The mine is looking better to-day than at any time for the past year. Heretofore thirty stamps of the mill have been running on custom ore, but hereafter only twenty will be reserved for that purpose. At the Amy and Silversmith the new 60-horse power boiler is in place, and will be housed by the middle of next week. Work on the west shaft of the Goldsmith has been suspended for the present. At the east shaft they are stopping between the 150 and 250-foot levels. The pay streak is from one to four feet wide. On the west end of the Rock Island, Youton Bros. & Co. have a lease, and are drifting east and west at a depth of 200 feet. The mine is looking well and producing rich ore. At the Parrot the 430-foot, and the three levels above it are being driven. Stopping is also being done over the first three levels

The mine is producing its regular 300 tons of ore per day, and yet is not exhausting its reserves, as the new ground being opened develops as much ore as is being taken out. Lower Independence district mining in the vicinity of Burlington is steadily on the increase, and there is but little doubt that this place will be a lively camp next summer. It is currently rumored that the owners of the Bluebird have recently purchased land for a mill site near there.

THE PYRENEES MINE.—*Inter-Mt.*, March 8: The Pyrenees mine owned by Mr. Salton Cameron and Mrs. Beattie Moss was purchased from them by a syndicate of Butte capitalists a few days ago and will soon be more thoroughly explored and developed. The purchasers have incorporated under the laws of the territory with the following named gentlemen as trustees: Messrs. J. Ross Clark, J. K. Clark, C. H. Moore, J. B. Cleveland and George W. Stapleton. The price paid for the property is \$30,000. It is now capitalized at \$500,000, having 100,000 shares of the par value of \$5 per share. It is the intention of the new company to proceed with developments upon an extensive scale. Ten additional stamps will be added to the mill plant, and other improvements looking to the reduction of the rich ore bodies in the mine will be made at an early day. The Pyrenees will soon be counted among the great precious metal producers of the territory.

NEW MEXICO.

SOCORRO.—*Bullion*, March 8: The Humboldt mining company, has struck a rich body of "royal metal" on one of its claims in the Cuchillo Negro mountains. Mr. Gustav Billing has purchased two gold-bearing properties in the Pueblo district, and located two extensions. The main claim is named the Helena. The property owned by Hon. F. A. Manzanares and Don Antonio Abeyta Montoya is being exploited by Joe Eaton, Wanless and Bentz. They are shipping the product to Socorro for treatment. The Iron Mask is the scene of active work, and the only obstacle now in the way of a large amount of development upon this property is the vast amount of water, which is difficult to keep within limits by the pump. Notwithstanding this impediment work proceeds regularly, and their force will be immediately increased as soon as the valves for the pump, now in transit, arrive. Messrs. Crawford and Richardson from the East, who are interested in this mine, are visiting the camp, and we are informed that they express themselves as entirely satisfied with its present outlook. Wm. M. Glasston has been industriously working the mines owned by himself and the Rev. J. M. Robinson of this city. The properties are situated in the Middle Oscura district, and afford argenteriferous copper and argenteriferous galena. The lodes are wide and the mineral continuous. The construction of the Socorro & White Oaks railroad would place their properties on a paying basis; as it would afford an outlet for their product. The galena gives assays of 52 per cent, lead and 42 ozs. silver. The argenteriferous ores run 6 per cent, copper, 10 ozs. silver and \$12 in gold.

OREGON.

PLACER AND QUARTZ.—Jacksonville *Times*, March 4: Considerable prospecting is going on in the vicinity of Phoenix. John Haviland is working his hydraulic mine near Kerbyville, and doing very well. Another vein of iron has recently been discovered on Burrage & Pomeroy's land in Rock Point precinct. A carload of ore from the Great Republic mine near Woodville is expected at Medford on the next freight train. Mage Carter of Ashland, who has found a ledge near that place, exhibited some fine-looking ore while here this week. B. F. Miller has leased his mines on Sardine creek to E. G. Hurt and the Messrs. Redden of Medford, who have commenced to develop them. C. C. Beekman, upon whose land on Jackson creek some good quartz mines are located will probably have some of the ore tested before long. Wm. Swinden is still taking some rich quartz out of his ledge on Blackwell, which pays well. Dodge Bros. have an extension that is quite promising. Wimer & Sons and Desells and Connell of Josephine county have a fine supply of water, and a very good report may be expected from them at the end of the season. L. D. Brown & Co. have purchased the interest of Chas. Kearns in a promising ledge on Jackson creek. They have purchased interests in several other mining properties. M. L. Pellett and J. Garvin of Wagner creek have one of the largest and best defined ledges yet discovered. They have prospected it considerably and report much ore in sight. A considerable amount of work has been done at Hays & Magruder's mines near the junction of Rogue river and Sam's creek, and cleaning up will soon be commenced there. The machinery of the new quartz mill at this place is being put in position as rapidly as possible, and will soon be in running order. Much benefit is anticipated from this enterprise. Water has been failing in many of the gulch claims of this and Josephine counties and a heavy rain alone will extend the season's run there; cleaning up is in progress in such places. Messrs. McClendon, Douden and Roberts have a very promising ledge on Gold Hill. They have taken out about \$300, and the ore they are now mining seems to have considerable free gold in it. The County Clerk is kept busy recording notices of locations, which shows that prospectors are active and many claims are being taken up. Fred Otten was up from Foothills creek this week, and reports the miners still busy, and some quartz excitement there also. He says that Messrs. Whitney, Cook and others have made some promising discoveries in that vicinity. D. M. Marden who is mining on Kane creek, found a nugget of quartz in his placer diggings containing several dollars in gold, not long since, which is evidence that a rich quartz ledge exists somewhere in that vicinity. Three tons of quartz from Walker & Anderson's ledge on Applegate was reduced at the Medford works a short time since, and it is said the result is quite satisfactory. We are informed that some of the ore went as high as \$90 to the ton. E. W. Jones of Portland has been engaged in superintending the putting together of the quartz mine at this place, and expects that it will be ready to commence running this week. Considerable ore is being hauled there already. Several nice pieces of gold have been picked up in Bybee & Hall's hydraulic mine near Kerbyville. They will not make as extensive a run as expected this time, but will dig a ditch next season to furnish the requisite amount of water,

The pleasant weather and cold nights are reducing the water supply perceptibly, and some of the placer miners have commenced cleaning up. The hydraulic claims all have plenty of water as yet, although a heavy rain would be very acceptable just now. O'Donnell & Ray, who are interested in the rich pocket found on Gold Hill a few weeks ago, still have the quartz they took out sacked up, so that none can tell how much they have actually found. They have sent for a small machine, costing about \$25, with which they will crush their own rock. Sol Lingle returned from the Gold Hill district this week, and reports a great deal of bustle still in that camp. He says some rich discoveries have been made, but whether they will prove of any permanence remains to be seen. Some of the quartz prospects exceedingly well, in a few instances going as high as \$1 to the pan.

UTAH.

SILVER REEF.—Southern Utah *Times*, March 8: The Stormont Co. produced 16,000 ounces of silver bullion last month. The shipments of ore from the mines to the mill, averaged thirty-nine tons per day, last week. The main incline in the Buckeye & Savage, has been sunk 150 feet below the 600-foot level, and a cross-cut was started for the hanging this week, at a point 125 feet below the sixth, leaving a sump twenty-five feet in depth. Work on the cross-cut in the Thompson is progressing, and the ledge is improving as the foot wall is approached. A streak of very good ore was encountered this week. The mine is now producing an average of 100 tons of ore per month.

THE CHRISTY CO.—The bullion output of this company, for the month of February, was 21,000 ounces of silver. Everything is running smoothly at both mill and mines, and the usual quantity of ore is being crushed. A cross-cut is being run for the top vein from the bottom of the working winze in the new shaft. The following ore shipments were made to the Christy mill this week: Couch & Knowlton, eighteen tons from the Silver Flat; M. Shoenake, eleven tons from the Maggie; James McDonald, five tons from the Tecumseh; Lockridge & Robinson, five tons from the Tecumseh. The new leaching works are running through between seventy-five and eighty tons of mill tailings, every twenty-four hours, with flattering results. If the same success will be met in reducing raw ores, and if chloriders will be paid a bonus for \$15 and \$20 rock, there will be as many miners at work on the White Reef, before Summer is over, as there are now at work in the mines on the Buckeye Reef. The owners and lessees of the Bonanza, Honest Miner, Leeds, Little Chief, Silver Gate, Gisburn and other mines on that side are anxiously waiting to see what price the new company can afford to give for custom ores. These mines have thousand of tons of ore in sight that will assay from \$15 to \$30 per ton, and if this character of rock will pay to extract, the leaching works will not want for material to run on for a long time to come.

THE CHRISTY.—Southern Utah *Times*, Feb. 28: A station is being cut on the 600-foot level, in the California, preparatory to sinking the working winze 100 feet deeper. The second level in the Maggie and the stopes in the third California were connected by a drift this week. Connections have been made with the lower stopes in the New Shaft, and ore is being extracted from these stopes as well as in those in the uprise. The mine is producing an average of seventy-five tons of high grade ore per week. Several chloriders made small shipments from Tecumseh Hill during the past week, and there are between thirty and forty tons of chloriders' ore piled up on the hill, but the mill was too busy running through company ore last week and will not be able to accommodate outsiders until after the 1st.

THE LEACHING WORKS.—A force of men was put on at the new leaching works this week, and the concern put in full operation. A number of alterations and improvements have been made since the plant was put in place, and every part of it now operates perfectly. Several tons of mill tailings were run through last week, as an experiment, giving results that were highly satisfactory to the managers. The rolls and rock-breakers are being placed in position, and when completed the company will be ready to crush custom ores. In the meantime they will work mill tailings, of which they have between 15,000 and 20,000 tons on hand. The success of the process in reducing our low grade ores, is beyond a doubt, and if the management will but act fairly with the chloriders, it will be a big thing for themselves and the camp. The Butte mine which looked so promising two weeks ago, has petered. The ledge which looked so well near the surface began to grow smaller as it went down, the hanging and foot walls began to gradually come closer together, until finally, last week, they joined in the country rock and disappeared without leaving a trace or marker of the fine vein of rich ore that appeared when the prospecting shaft was started. The lessees have about given up all hopes of finding a mine on the Butte ground; and this property, which was so big a bonanza when filled with water, will be abandoned as worthless.

WASHINGTON TERRITORY.

THE COLUMBIA BELT.—Stevens Co. *Miner*, March 13: A new strike has been made on the Columbia river belt, near the Little Dalles, which promises to rival any former discoveries. We could not learn the particulars, but from our knowledge of the lay of the country up there it is reasonable to believe, that the purported find is of no small consequence, when we consider the fact that the richest mines now being developed in this region are located on this great mineral belt. From a short distance northeast from Fort Spokane, this ore bed, measuring from 8 to 10 miles wide, can be traced through the mountains straight along for a distance of 80 miles, including in its course Riekey Hill, Gold Hill and Young America camps, which are all being worked heavily by stiff companies, who have confidence in their prospects, and are not afraid to put their money where it will do the most good, employing several hundred men in the development of their prospects, putting up mills and preparing for the erection of smelting works. About the point where the news falls from on the east side of the river is where the belt turns and runs at right angles southeast, and can be traced through the mountainous country, and shows up good prospects all the way to Butte City, M. T.



1850. 1885.
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...BUILDERS OF...
MINING MACHINERY.

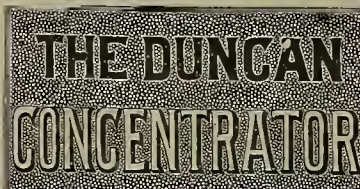
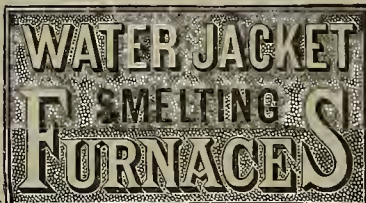
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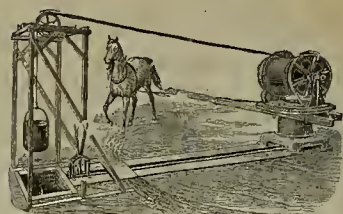
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For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



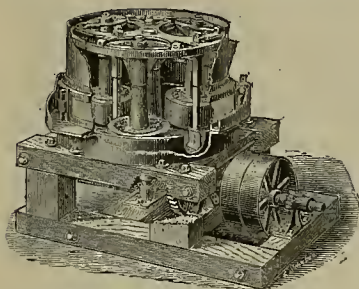
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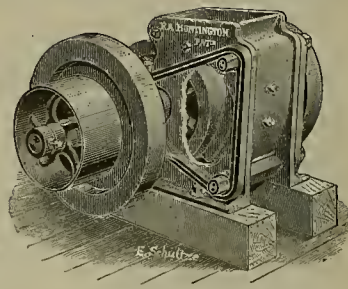


Centrifugal Roller Quartz Mill.

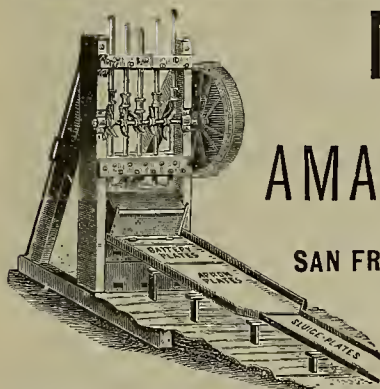
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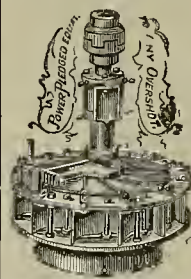
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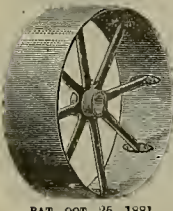
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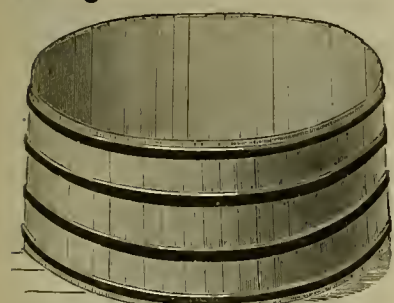
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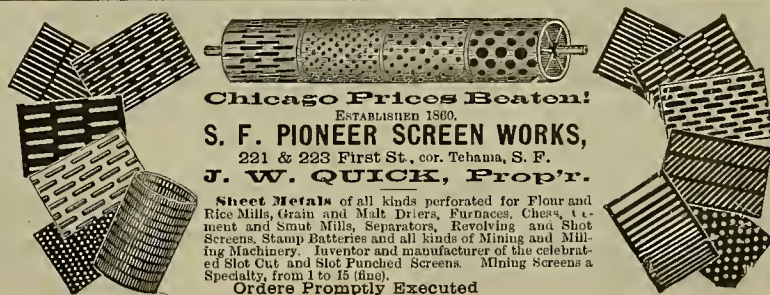
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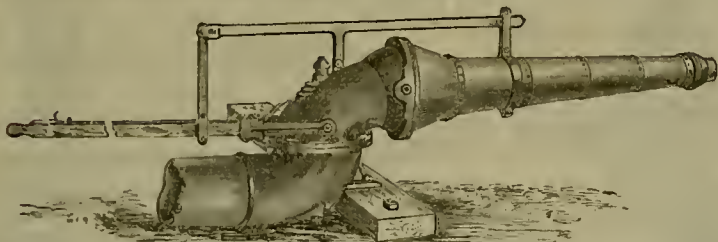
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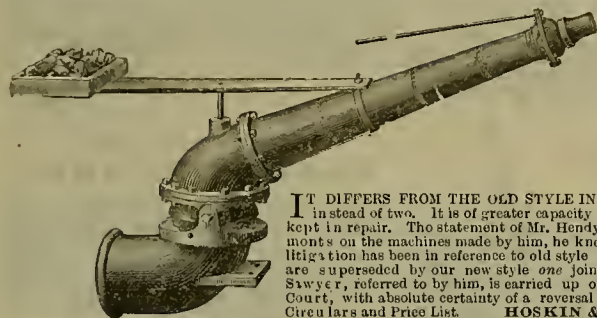
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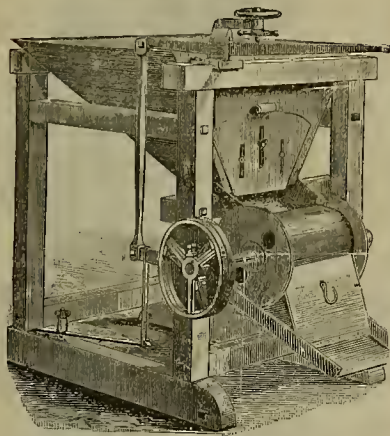
In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrounding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by
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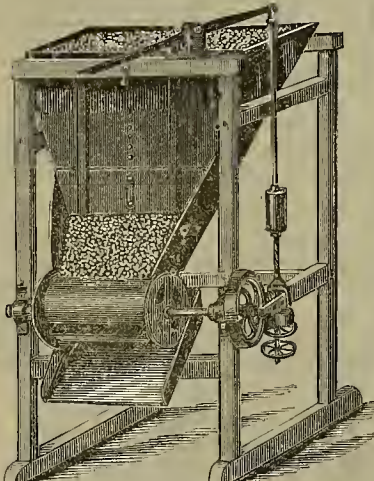
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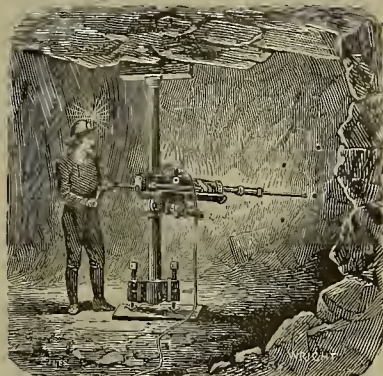
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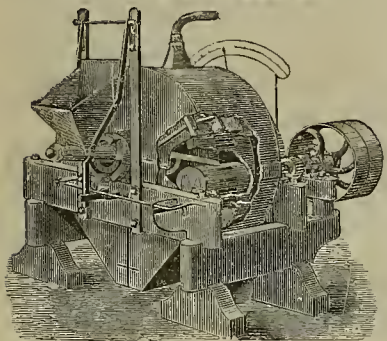
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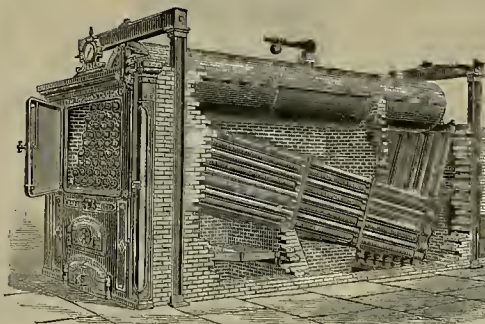
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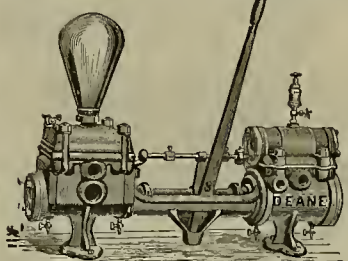
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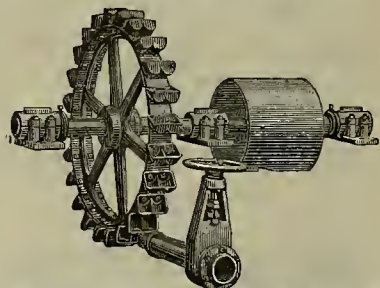
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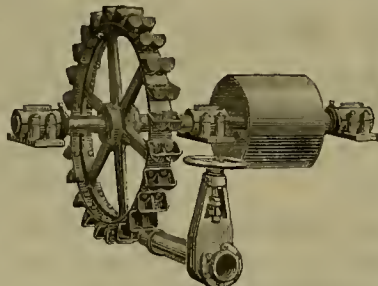
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complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. This, light plating
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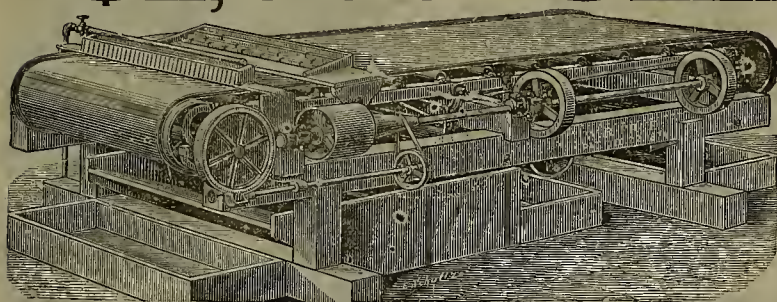
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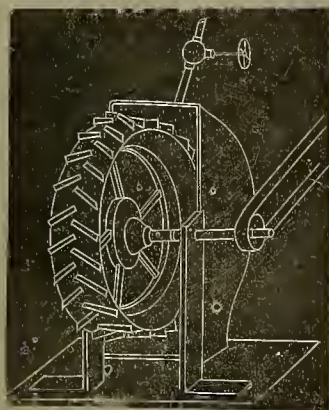
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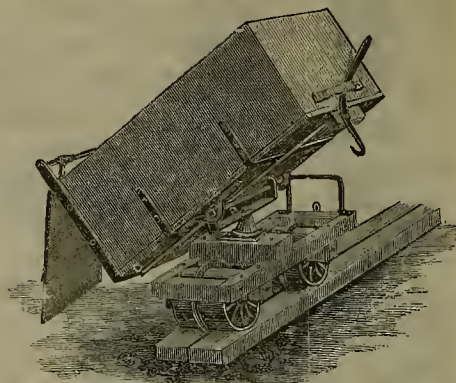
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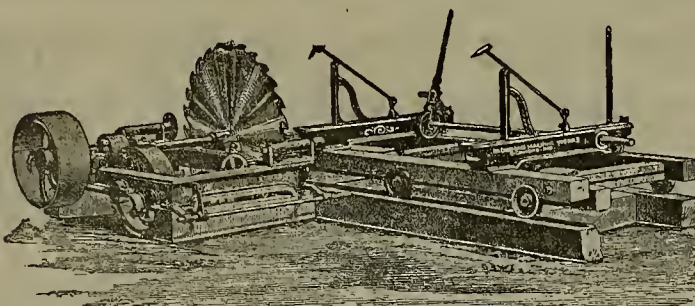
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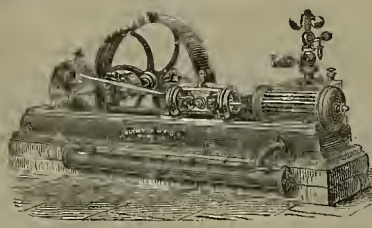
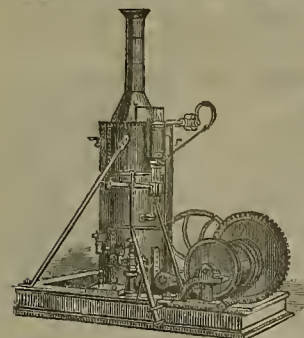
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, MARCH 27, 1886.

VOLUME LII
Number 13.

A Big Pumping Plant.

The San Francisco Tool Company's Latest Machinery.

An immense pumping plant was completed this week at the San Francisco Tool Company's shops, and is now being shipped to its destination at Walnut Grove, about 15 miles below Sacramento, where it is to be used in reclaiming land. The pump is the largest low-lift pump ever built on this coast, and the outfit is probably the largest single reclamation plant in the United States. The diameter of the discharge pipe is 40 inches, and the runner is of the same dimensions. The capacity is rated at 40,000 gallons a minute, 2,400,000 an hour, or 65,600,000 gallons in 24 hours. The engine is of special design, very compact and well made. It is a compound engine, the bed being made hollow so that the steam from the high-pressure cylinder enters the low-pressure one, through the bed of the engine. The total weight of the engine, pump and bed plate is 16 tons. The three boilers are already on the ground. The pump has only to raise the water 10 feet to 15 feet to throw it over the lever.

The pumping plant was made for the San Francisco Savings Union. The contract was made between P. J. Van Lohen Sels, president of the Walnut Grove reclamation district, and the San Francisco Tool Company, this being the third pumping plant he has purchased from them. The others were 15-inch pumps. This new one was added as a measure of safety, and to quickly get rid of the rain water.

On Wednesday last a number of gentlemen met at the shops of the Tool Company to see the engine in operation and examine the pump. Mr. Van Lohen Sels stated, after the party had adjourned upstairs, that he made up his mind to have this new pump to cope with the rain water, and on February 2d spoke to Mr. Ira Bishop, of the Tool Co., concerning it. At that time there were no drawings or anything else. Notwithstanding the short time, the whole plant was now ready for shipment, in seven weeks' time. He thought the Tool Company deserved special commendation for their work, and he expressed his special appreciation of the skill of Messrs. John Richards, Ira Bishop and Arthur F. L. Bell.

Mr. Wm. Aldrich, the president of the company, said that when they started these works it was thought by some that the field was already filled. But they began with one idea in view, and that was to build high-class machinery, put in the best work, and he prompt. The only chance for an opening was to do these things, and they have lived up to the idea as well as they could. They made every tool in their shop themselves. To do the work well and deliver it promptly was their only dependence on business. He felt grateful for the pleasant words spoken by their patrons of their efforts, and was glad to see that their work was appreciated.

Mr. Bell, who was present, referred to the kindness shown to his son, A. F. L. Bell, by Messrs. Richards, Bishop, Aldrich and the

others. He said that long since he had made up his mind to make mechanics of his boys, rather than clerks, and it was pleasant to acknowledge that the officers of the Tool Company had taken an interest in encouraging a young California mechanic, and giving him credit for his work.

A representative of the MINING AND SCIENTIFIC PRESS in referring to Mr. John Richards, the originator of the company, stated that when he first came to this city, he began at the bottom, and accepted the position of a draughtsman in one of the foundries, saying nothing of his high abilities. But his skill and genius soon

Lower California Mines.

The mining regions of Lower California are now again attracting attention. The great difficulty of the country generally is lack of water. Several "dry placers" have been found which would pay handsomely could water be obtained. There are several good mines, however, being worked, which are paying well. A small mill was sent down not long since to a gold ledge, which is reported to be panning out nicely. The San Nicolas gold mine, near the Real del Castillo, is turning out good ore, upon which the mill is kept running, and work will soon be

Mines Up North.

Owing to lack of water they have been having some difficulty with the big 120-stamp mill in Douglas Island, Alaska. The mill, concentrators, electric lighting plant, etc., have been run by water power, Knight and Pelton wheels being used. The prevailing cold weather of late has made the water supply short, and only \$77,000 was shipped last month. It is stated that the mill will soon be supplied with steam machinery, to be used hereafter when the water supply is short.

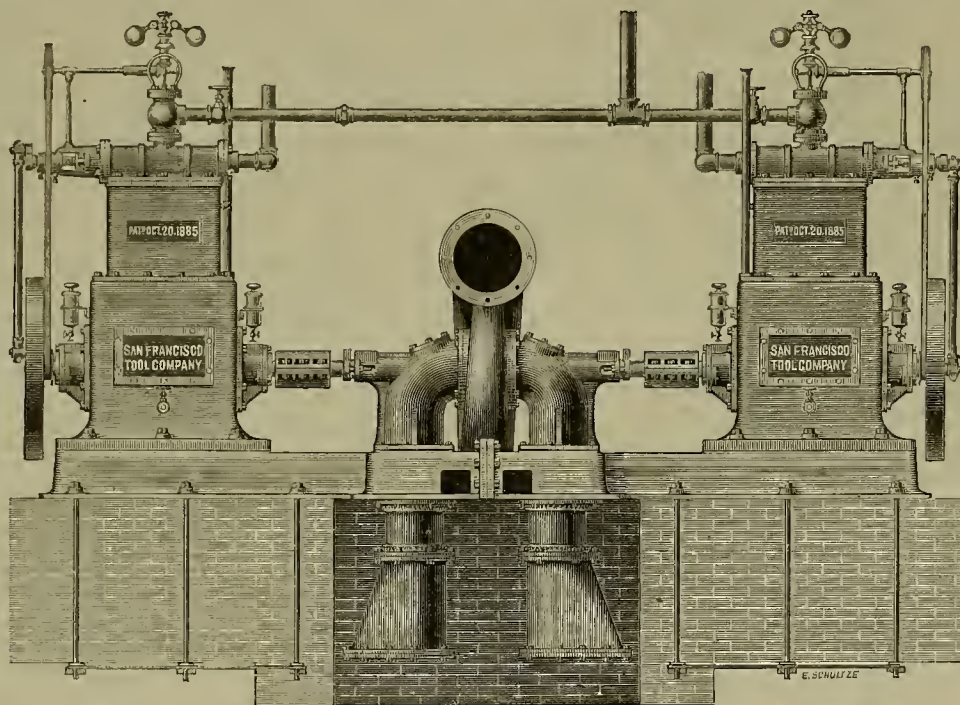
There is said to be quite an excitement at Juneau, Alaska, over mines found on the Yukon river. About 125 men have already left the old mines at Juneau to go to the Yukon, and 60 more were about starting at latest advices. The cause of the great rush was the fitting out of 11 men, with 5000 pounds of supplies, by Captain Carroll and his partner, W. M. Murray, who have had men in that country two years, and it is expected that they have struck something rich. The captain was interviewed by a delegation of miners, but would give no information as to the strike. There have been several prospecting expeditions to the Yukon river, and although gold was found, it was not in sufficient quantities to pay in that region. The next steamer will probably bring further news of the find and the exact locality. The Yukon is one of the largest rivers on the continent.

It is stated by a recent arrival from the Cassiar mines that Messrs. Thibert, Moore and Law, who have been working on Mosquito creek, have struck it very rich in their tunnel. Several new locations have been made on the creek since the strike. The winter has been very cold at Cassiar, the thermometer standing at 55 degrees below zero for fifteen days.

A VERY skillful piece of engineering in a water tunnel at Riverside, San Bernardino county, came to a finish last week, when the two forces of hands working in from each end of the tunnel met. The tunnel is over 3,000 feet in length, and part of it is a curve, yet so true were the calculations made, that when they met in the center there was not one-fourth of an inch difference in the two divisions.

THE American Consul at Guaymas, Mexico, has informed the State department that two Californians, named William Brown and James Moses, owners of the Grand Republic mine at Nacosari, in the district Montezuma, were killed by Mexicans a short time ago. This makes five Americans in all who have been killed at that mine within a year.

GEORGE HEARST, who has just been appointed United States Senator from California in place of the late General Miller, by Governor Stoneman, is well known as a prominent mining man. He has large mining interests not only in California and Arizona, but all over the coast, and has accumulated many millions by his mining ventures.



15-INCH PUMP AND TWO ENGINES FOR LIFTS FROM 30 FEET TO 50 FEET HIGH.

forced itself upon the knowledge of others, and, though a modest man, he has long been recognized as one of the most thorough mechanics of the city, ranking with Scott, Dickie, Moore and others of acknowledged ability who have been long with us.

The engraving on this page, though not a picture of the big pump referred to, shows one of the pumps of which it is a type. The engraving represents a plant intended for water works where the lifts do not exceed 50 feet in height, and where large quantities are to be handled. For this two upright single-acting engines are used to operate the pump. The pump is a 15-inch one for lifts of 30 to 50 feet, and has a capacity of 14,400,000 gallons in 24 hours.

FASTEST STEAMER IN THE WORLD.—The new torpedo boat built for the English government in London by Yarrow & Co. has attained the wonderful speed of 24.027 knots, or 27.66 miles, an hour. This beats the record of the American steam yacht *Shiloh*, built by Herreshoff, and makes the English craft the fastest steam vessel in the world.

A HUNTINGTON mill, engine and rock breaker has been put up at the Reilly & Mathews mine on Squaw creek, Shasta county.

commenced on the San Francisco. The talc mines are producing a large amount of fine white talc, for which there is an increasing demand for the manufacture of the finer grade of wall papers, embossed cards, etc. A correspondent of the San Diego *Union* writes that negotiations are pending for the opening up of the old tunnel group of mines, and starting up the mill. These mines have turned out a large amount of gold, but have never been properly opened. The new vein is two and a half feet wide and yields \$220 per ton by mill process. It is free milling gold ore. Negotiations are also pending for the great nickel mine, known as "Allen's King of Nickel," also for the "Bay State" nickel, the "Alum Deposits," and for two or three of the mica veins, and for two or three of the copper mines. These are all English companies, with plenty of capital. It looks upon every side as if the frontier had entered upon a new era of prosperity.

THE placer diggings recently discovered near Glenn's ferry on the Snake river, Owyhee county, Idaho, are attracting considerable attention.

SPEAKER CARLYLE does not think that the present Congress will pass any bill suspending silver coinage.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Dillon, Montana.

[From Our Traveling Correspondent, F. G. HUSTON.]

On getting hitched up to leave Bannack for Dillon, it commenced to snow, and for about an hour we could not see across the street. However, it cleared up and I pulled out, as I was afraid to stay longer, thinking I might get snowed in and not be able to get across the range. Bannack for many years was the county seat of Beaverhead county. When Dillon was established, however, and grew so rapidly, it being nearer the center of the population of the county, it was made the county seat. The people of Bannack are now discussing the building of a wagon road down Graepper creek, twelve miles, to the Beaverhead, and thus have a railroad within twelve miles. If that is done, the Dillon people will probably lose the Bannack trade entirely, except so far as county seat matters are concerned. It will only be a natural result to arrive at, that they will build this grade, for a saving of wagon transportation for twelve miles is quite an object even for a sparsely settled community. For a town like Bannack, with the mining expectations to back it, this mere hagbelle to build a wagon road through a canyon for twelve miles will not long delay them.

Tin Mines in Montana.

Southeast of Dillon 12 miles is a location that is developing a fair percentage of tin. This discovery was made a long time since by John Gray, and samples were sent to different places. The different analyses made returned iron ore and a half per cent tin to 11 per cent, but the more exciting race after riches in placer gold mining this was overlooked and forgone, having been for years unthought of. Mr. Gray left Montana and went to New Mexico, and one night there in a hotel bar-room was describing the tin mine he discovered in Montana twenty years before. This was overheard by Major J. W. Peck, who soon after hunted up Mr. Gray and told him if he could verify his statements he had a good thing. He gave him the names of the parties to whom he had sent ore for analysis, and he at once opened communication with them and found the record as Mr. Gray had stated. He then satisfied Gray from a financial point of view and started for Montana to rediscover the mine. This he had no difficulty in doing through Gray's data. Since this time he has been busy at work developing, and now is organizing a stock company to operate it. His success seems to be assured. The company is to be called the Montana Tin Mining Company. There are two locations—one the original discovery, called the Belmont, and an extension, called the Globe. The company is to be incorporated with \$2,000,000 capital stock; a number of the solid men of Montana are taking shares. No doubt by the end of another mining season this mine will be heard from in a satisfactory manner. The ore contains nickel, cobalt and manganese, and also a trace of gold, and the mine is very conveniently situated, as a team can be driven right to it without difficulty. The mine is of what is termed "hlankety" and in granite and porphyry formation. The developments thus far are two tunnels, each in about 70 feet, and the showing is about the same in each of these. The rather singular manner in which this mine has come to the notice of the public makes it almost an object to listen to old miners' stories, even if "whisky is in and wits out." Leaving Dillon, I travel

Down Beaverhead Valley

Through a continuous line of fine farms, well improved, with large, fine houses and large barns, giving evidence of a prosperity continued through a long term of years. Most of the men engaged in ranching here have combined either one stock interest or the other with their farming, and thus each one has a hunch of either horses, cattle, sheep or hogs. These will always bring money, so they range their stock on the foothills near by in the summer, and then in the winter feed them for the Butte market in the spring. Twenty-five miles down the river I came to Mr. James M. Page's, one of the "old-timers" in Montana, whose latch-string is always out, and he says particularly so to newspaper men, as they are sociable fellows. Mr. Page is an old soldier, and I was made to feel right at home for the time being, family style being quite a change from the usual roadside inn fare we are accustomed to get along the road. Twin Bridges, a few miles below, is a small town near the junction of the Ruby, Beaverhead and Big Hole rivers, forming the Jefferson, and contains about 150 inhabitants devoted to the usual avocations for the local inhabitant of a town of that size in a farming community.

Ten miles further on toward Virginia City is

The Town of Sheridan.

This is built on Mill Creek, a fine mountain stream, and the site of one of the first flouring mills ever built in Montana. There is another flouring mill here now called the Silver Spring mill, four miles from the town on Ruby creek.

There was a smelter built here some three years ago by a Philadelphia company. Mr.

F. J. Jones, manager and general superintendent, whom I called on, and that the company was, at the time the works were put up, short of means. This was the reason that they have never done anything, but that this spring the works were to be started up, without doubt, as more capital had been put in, and that from developments that have already been made in the vicinity, there is no doubt that they would have all they could do, and such being the case, cannot fail to be profitable, as they have everything at their command and cheap to work with.

Mr. J. M. Johnson, formerly interested with N. Armstrong in merchandise at Glendale, is developing a mine up in the mountains, a few miles from Sheridan, and he assured me that the district was a promising one. He has 200 tons of \$100 ore on the dump at his mine, and not being a man given to extravagant statements I have no doubt that it is a correct estimate. From Sheridan it is nine miles to Laurin, another postoffice and store, just below the junction of Alder gulch with Ruby. Perhaps it may be well to say for the benefit of old Montanans who may read this article that Ruby creek in former years was called "Stinking Water." The town does not make many pretensions beyond a country cross-roads. Soon after leaving Laurin I came to

Alder Gulch.

And the evidences of the tolling placer miner loomed up. This old gulch was almost without a parallel in the annals of placer mining, and as to volume there is no question about her standing far in advance of any placer in Montana. The yield to the beginning of the present year was between \$70,000,000 and \$75,000,000—a large sum for one gulch to produce; would that there were more of them. Nearly this whole sum has been from the placer mines, and there are yet 13 bedrock flume companies operating, working the ground over a second time and realizing handsome returns.

L. A. Fenner, of Nevada, two miles below Virginia, showed me a pit 100 feet square, which yielded \$4000, for working over and requiring a little over 400 days' labor. That is a good property, as wages at \$3.50 per day, leaves the proprietor a handsome dividend for his labor.

These flume companies probably average \$25,000 per season, as one of them last season cleaned up over \$50,000. Mr. Fenner, who by the way, is quite an inventive genius, has a machine in operation on his claim to gather the coarse rock and gravel from the flume and thus save filling up his dump (which is very limited), carrying out the old adage that "necessity is the mother of invention." I think it will no doubt be patented and used by many others similarly situated. It works to a charm and does the work that five men would do with forks, and it is cheaply constructed and easily operated by a small stream of water on a 12-foot overshot wheel. It gathers a load of rock and gravel and is then thrown in gear and turned over into a car. This, when full, is run out and dumped automatically by the same power that lifts the separator away from the flume with its load of gravel, and is easily operated by a boy. He ran it for three weeks before the season closed this last year without a stoppage for repairs or breakage, making it a very satisfactory test for a new machine.

Mr. Fenner is one of the old stand-bys of Alder gulch, having come in with the first stampede in 1863 and has made his home here ever since, following the uncertainties of a gold placer miner's life with the usual varied success that attends it. He has a large amount of ground ahead of him, enough to last him the term of a natural lifetime.

The quartz interests in and around Virginia have been the Waterloo of many companies and individuals, and with very few exceptions they have been disastrous failures financially speaking. The old Kearsarge in the Summit district is about the only one that any money was made out of. Colonel Postelwaite in a very short time cleared \$70,000, and then the ore became base and with their then improved appliances they were unable to work the ore to a profit. It was finally shut down and in the course of time the mill was dismantled and it was unthought of for a long term of years. It has lately been relocated by Messrs. Hyde & Barber and shows up a fine body of low-grade ore nearly 20 feet wide and prospects from \$6 to \$25 per ton. They have opened at a new point with an open cut and are satisfied that they have a good property.

The Bell Mine

Is in the old Fairweather mining district, two miles south of Virginia, and is owned by L. B. Bell, E. Carman, M. Bolinger and D. A. Thornton, and known as the Bell Mining Company. They have the best developed lead in this vicinity, having three long tunnels run in on the lead and numerous crosscuts and levels run to further satisfy them of the stability of their property. The upper tunnel is in nearly 400 feet and runs on the ledge for nearly 300 feet. A number of crosscuts run at different points from wall to wall show a ledge from 12 to 16 feet wide. Ore sent to Salt Lake and treated from this tunnel averaged \$28 per ton.

The lower tunnel is in 720 feet; about 400 feet of this distance is on a continuous chute of ore, assays showing from \$12 to \$125 per ton, and crosscuts run in a number of places show the ledge to be widening as they go down on it, the width averaging from 20 to 26 feet. The ledge has also been opened at a number of

other points, and wherever they have touched it they found good prospects.

It is a contact vein having a lime foot-wall and granite hanging-wall. The mine was originally discovered by Mr. L. B. Bell, and the other parties became owners of one-half by paying him some \$1500, and doing a large amount of developing. From the amount of tunnels, and levels, and crosscuts that have been run on the property, I think they have religiously kept their contract, yet it is the subject matter of a long litigation between themselves and Mr. Bell, and until that matter is settled the property will no doubt be a non-producer, which for the prosperity of Madison county, and Virginia City in particular, is a hard blow. They have been to work on this lead for seven or eight years, and should they ever get their legal differences settled, it will no doubt be heard of in mining circles more extensively. Six years ago a quantity of ore was taken at the grass roots and milled in Platter's mill, returning 40 ounces silver and \$35 gold; this in connection with many other tests make it a reasonable proposition that the property is a good one.

The Way-Up

Is owned by Messrs. A. M. Hart, J. S. Snyder and G. W. Smith. It is in the same ridge and has the same character of ore as the Bell. Has three shafts; one down 35 feet, another 90 feet, and another 80 feet. Some stoping was done some years ago in the 90-foot shaft, and considerable bullion was taken out. Some shipped to the Colorado smelter at Butte returned \$72 per ton. This is another immense lead and when a plant is once placed where they can get their ore worked without paying the whole product out for freight and reduction, it will yield its owners a handsome competence. They are now running a tunnel to strike the lead at 300 feet in depth; this is now in 380 feet and they expect to strike the lead at 70 feet further. Should it prove as good at that depth, they will feel assured of the permanency of their mine.

The Alameda mine is located two miles from Virginia, between Alder and Brown's gulch, and is now the only property that is equipped for the reduction of ore. This property was purchased a few months ago from Thomas Deyarmon and Thexton by the New York and Montana Mining and Milling Co. for \$30,000. They at once commenced work in a systematic manner to develop a property; there was a tunnel in some 400 feet, and they now have a shaft down a considerable distance; have a steam hoist and an air compressor, and although their lead is very small, they are keeping their mill running. They have a characteristic that is common with nearly all Eastern companies. That is of not allowing visitors. Their plant consists of a rock breaker, five stamps and one of Sturtevant's ore pulverizers. Messrs. Frazer and Chaluners, are sending out one of their experts to instruct them how to operate the pulverizer, as it has not met with expectations so far. They are provided with a White improved cylindrical roaster, and the usual equipments of pans and settlers, making it a complete plant for this section, and will no doubt be the means of attracting others.

The Prospect mine, one mile north of Alameda, owned by G. W. Layton & Rice of the Butte Hardware Company, is a large and finely developed property. The lower tunnel is in 600 feet on a continuous ore body, from six feet to 15 feet in width. A portion of this prospects very high and has the appearance of making a good paying property. During my visit this mine was visited by an expert from New York for some parties, but as I have not seen any record of a sale being made I presume they failed to agree. The price asked was \$150,000. They have a large quantity of low grade ore, which might be concentrated to advantage and this, in connection with a small body of very high grade ore, ought to make it one of the finest properties of the district. A sample taken by a disinterested party and sent to the Ontario, Utah, for a test, made a return of 85 cents per pound.

Brown's Gulch district, five miles south of town has some very promising properties. Some years ago, two mill properties were erected here, but the imperfect machinery here brought about the usual results, and enough could not be saved to make the properties pay. They lay idle for years, until within the last four or five years more or less prospecting has been done, and some ore shipped that yielded satisfactorily.

Vanderheck and McAdams have a prospect called the Ovid, and have a tunnel in some 60 feet, with about 3 feet of ore in sight that assays from \$40 to \$50 per ton.

The Comet and Sonora.

The Comet owned by the same parties is on the west side of Brown's gulch; is opened up in a number of places and shows 3 feet of ore, a portion of which prospects very rich. They have 200 tons on the dump, that from a number of average assays have returned \$50. Their lower tunnel is in 125 feet all in good ore and they also have the mine open at the extreme north end. It also looks well there.

The Sonora, owned by J. M. McAdams, is pretty well developed. Some of the ore has been worked with arrastras and the last nine tons worked yielded over \$800; averaging over \$90 per ton. The lowest average by working in the arrastra returned \$30 per ton. This property has a number of shafts down, the deepest being 125 feet and from these a number of levels

have been run; the appearance of the ore in each opening being about the same—the ledge averaging 3½ feet in width. There are a number of other properties here with more or less development, and each owner is sanguine that he has a mine that will sooner or later yield him a fortune. Two miles further up Brown's gulch are some of the finest properties in the vicinity of Virginia.

One, the Sprat, is owned by Thomas & McRoberts. Their lower tunnel taps the lead at 60 feet in depth; have run levels each way and have crosscut the lead. They have a fine body of ore in the other tunnel, and have run levels each way; on one side 40 feet on the other 250 feet. A three-ton sample sent to Salt Lake for treatment returned \$76 per ton. In many places their assays have run up to near \$200 per ton. Many years ago a shaft was sunk on this lead and the ore milled in the old John Howe mill and returned \$38 per ton, but the ore is full of iron pyrites and to save all the precious metals in it will require well equipped reduction works.

(To be Continued.)

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SAW-SETTING DEVICE.—Daniel Behmer, Santa Rosa, No. 336,201. Dated Feb. 16, 1886. This relates to that class of saw-sets in which an adjustable rest is provided for the saw-blade, and an adjustable gauge defines the position of the teeth under the hammer; and the invention consists in the manner of mounting the rest, and fixing it whenever adjusted, in the means for adjusting and holding said rest at any desired angle, and in the construction and means for adjusting the tooth-limiting gauge.

IRON BEDSTEAD.—Andrew L. Pringle, S. F., No. 337,519. Dated March 9, 1886. The invention consists in the novel construction by which the union or joint at the corners of the headstead is made. The object is to simplify the construction of the headstead, and at the same time strengthen it and lessen the cost. Further objects are cleanliness and safety, the latter being of importance by reason of the nature of the use of such bedsteads, they being employed in insane asylums where the cunning of the occupant may lead him to take the bedstead to pieces, provided this can easily be done.

AGRICULTURAL IMPLEMENT.—John D. Scott, Petaluma, No. 337,525. Dated March 9, 1886. This is an implement for cultivating the ground, and is used more especially for planting potatoes and similar articles. It consists of a frame having peculiarly adjustable cutters or teeth, a vehicle mounted upon wheels, and a means for suspending the frame with its teeth from said vehicle so that it may be raised or lowered at will, and a mechanism by which the draft is applied both to the vehicle and the cultivator, together with a device for planting the potatoes, and a means for indicating the distance between the hills.

ROLLER CULTIVATOR.—John Clay, Camptonville, Yuba county, No. 337,480. Dated March 9, 1886. This roller cultivator consists in a rolling frame or cylindrical core, having hinged to its periphery a number of independent sections, preferably these, each section comprising a number of parallel bars hinged to each other and provided with teeth. As the cultivator rolls along, each section as it passes its center of gravity, drops forward away from its seat upon the periphery of the core and falls flat upon the ground, its teeth breaking the clods, and the core, advancing, rolls over the fallen section, pulverizing the broken clods and winding up the section behind it, while a second section is being dropped down. The blows received from the falling sections cause the soil to break and pulverize in a most thorough manner, reducing the clods to fine soil.

CUT-OFF VALVE.—John P. Simmons, S. F., No. 337,025. Dated March 2, 1886. This invention relates to certain improvements in valves for engines, and it is especially applicable to valves, such as are shown in his patent of September, 1884, and illustrated in the PRESS on page 141, February 27, 1886. It consists of a tapering main valve with a cut-off of the same shape inside of it, having an inlet upon one side of the casing, within which it oscillates, and steam and exhaust ports on the opposite side. These valves are closed at both ends, and have trunnions at the larger ends, and valve stems extending outward from the smaller end, and cranks or eccentrics by which they are operated. In combination with these Mr. Simmons employs a packing to provide a steam tight joint between the neck of the inlet passages and the main valve, and prevent the unseating of the valves by allowing steam to pass through openings in the trunnions into a recess at the ends, this pressure being sufficient to prevent the valves leaving their seats on account of the taper.

AN ox was recently killed near Eureka, Humboldt county, and in its stomach was found over a half a pound of two-penny finishing nails. They were worn smooth and bright by the action of the acids of the stomach.

MECHANICAL PROGRESS.

The Defective Steel Plate Problem.

We have alluded in these columns to the repeated reports of strange failures of Bessemer steel plates in the English marine service. British steel makers have become greatly interested in investigations as to the cause of such failures. At first these investigations were so unsatisfactory that certain steel and metal ship building circles were quite unnerved at the new danger presented. Quite recently, however, there seems to have been a ray of light thrown upon the matter, which gives encouragement to hope that the cause of the trouble has been brought to light, and that the danger will be avoided in the future production of such plates. Evidence is accumulating, according to the report of Mr. Stromeyer, one of the investigators, that in nearly all cases in which mild steel plates have been found to fail in an unaccountable manner the plates have been subjected to bonding or hammering while hot, and that there can be little doubt that while they were being worked these plates were at a blue heat, or as smiths and boiler makers term it, a black heat. By the expression "blue heat," Mr. Stromeyer, as we gather from the correspondence of the *American Manufacturer*, includes all temperatures which produce discolorations ranging from light straw to blue.

Injurious Effect of Blue Heat on Steel Plates.

Such treatment, Mr. Stromeyer reminds engineers, is the most injurious to which steel can possibly be subjected, and he remarks that although similar failures occur in iron plates, yet the metal being less ductile than steel, the failures are not so glaring. He would not, however, have it supposed that all failures are due to this cause. He, like many other engineers, is acquainted with instances in which plates of both iron and steel have failed without this treatment, although with the usual tests the quality of the material was good. Three hundred and sixty experiments have been made by Mr. Stromeyer, and they have consisted mainly of bending and of tension tests. It appeared from these experiments that the limit of elasticity of both iron and steel was raised by repeated testing. A test piece shortened when cold showed a reduction of the elastic limit; but another piece shortened when hot showed an increase.

Loss of Ductility With Blue Hot Steel.

Steel which had been bent cold, either once or twice, would stand almost as many subsequent bends as the original test piece. But if the same material was bent once while blue hot, it lost a great deal of its ductility.

Out of 12 samples, in which two preliminary hot bends were made, nine broke with a single blow of a hammer, and the other three only stood one or two subsequent bends. Thin Low-moor iron did not break quite so easily, but supported about one-half the original number of bends.

The Difference Between Good Iron and Mild Steel.

Seemed to be that iron broke more readily than steel while being bent; that iron suffered more permanent injury than steel by cold working, but that if it had successfully withstood bending when hot, there was little probability of its flying to pieces when cold like mild steel. It was said to be a common practice amongst boiler makers to "take the chill out of a plate" if it required a little setting, or to set a flanged plate before it was cold. This was nothing else than working it blue hot. All hammering or bending of iron and steel should be avoided, unless they were either cold or red hot. Where this was impossible, and where the plate or bar had not broken while blue hot, it should be subsequently annealed. Boiler makers are now

Guarding Against Failure

By the cessation of work as soon as a plate, which had been red hot, became so cool that the mark produced by rubbing a hammer handle or other piece of wood over it would not glow. A plate which was not hot enough to produce this effect, yet too hot to be touched by hand, was most probably blue hot, and should, under no circumstances, be hammered or bent.

Further Investigation Desired.

It was almost a work of supererogation for Mr. Stromeyer to suggest that the question should be further investigated, and that steel masters should endeavor to ascertain whether every quality of steel was made permanently brittle by being worked at a blue heat. There can be no question that further investigations will take place and that some important results may be expected. By reason of this danger mild steel is rapidly coming into favor and taking the place of basic and Bessemer metal among English iron workers.

NAILS FROM OLD STEEL RAILS.—A Pittsburgh daily reports Mr. Bernard Luth as speaking as follows concerning his process for making nails out of old steel rails: "It is now entirely controlled by a syndicate of capitalists, of which General Beaver is at the head. They will, I understand, only sell the right to seven or eight firms in the United States, one on the Pacific Coast, one at Chicago, one in Ohio, the one at

ready established in Pennsylvania, at Bellefonte, and one or two more. Their idea, I believe, is not to have them conflict with each other's business. The mill at Bellefonte is now running on the new plan and from one pair of rolls turns out 30 tons per day of nail sheet from three-foot rails. Since it was introduced I have made an improvement by which nails can be run six feet in length, thus doubling the amount turned out, without any additional working force. By it the cost of making steel nails can be reduced about 20 per cent. The use of steel nails is growing very fast, and I believe that in a year from now very few iron nail mills will be running."

Improvements in Wrought-Iron and Steel Castings.

One of the great difficulties in making castings from steel is to get a product which is solid, sound, homogeneous, or free from blisters or cavities. The addition of ferro-manganese and other compounds containing carbon, silicon and manganese makes the product somewhat more solid, but deteriorates the quality in other respects, as the product gets harder and more brittle or red short. It has been impossible to make castings of wrought-iron or mild steel at the same time solid and retaining their qualities and their strength.

It has, however, recently been discovered that either wrought-iron or mild steel castings may be obtained solid and free from blisters or cavities, and that, too, without changing the peculiar qualities of either metal, by simply adding about one per cent of aluminium. The addition is made after the iron or steel has been melted, and preferably just before the pouring is commenced. The melting point of aluminium is about 500° F., and the effect of its introduction is to lower the melting point of the mixture, and thereby render it more fluid, so that the gases in the metal pass away easily, the metal runs freely into the mold and a more perfect product is obtained. No fluxes whatever are used. A very minute quantity of aluminium, even less than one per cent, is said to have the desired influence.

Perfect castings of considerable ductility and great tensile strength have thus been made from the softest wrought-iron. The iron or steel is melted in crucibles, converters, or metal smelting furnaces of any description. It is convenient to provide a plug in the cover of the crucible, which is removed when the metal is completely melted, a tube is inserted into the aperture, and the aluminium to be added is passed down the tube. The tube is removed and the plug replaced, and the metal is soon ready for pouring.

According to the *Scientific American* Mr. Nordenfelt, the inventor of the well-known machines is the discoverer of the process. Other writers say that the invention has been made and patented by C. G. Wittenstrom, of Stockholm, Sweden.

Welding Iron and Steel.

A series of experiments were undertaken by Prof. J. Bauschinger at an instance of an engineering firm. Similar experiments had been previously made at the Royal Mechanical Technical Experimental Institute, at Berlin, and by W. Hupfeld, at Prevali, very favorable, as regards the welding capacity of steel. Professor Bauschinger recapitulates the main results of these tests before describing those made by himself. The materials used in the latter were steel, from the Peine Iron Works, at Hanover, and bar iron of various sections from the Neue-Hoffnungshutte, near Herbauer, in Nassau. The test pieces were flat, square and round in section, the largest being 3.149 by 1.181 inches. Each piece was cut in two, cold, swelled up on the anvil, when hot, 0.196 to 0.392 inch, and after heating to the proper degree, the two portions were laid on each other and welded together by hand or steam hammer. Some preliminary studies were made in the laboratory of the college to ascertain the best method of welding and the best flux for steel; quartz sand answered the latter purpose, while it was found that a rather less degree of heat was required for steel than for wrought iron; a pure coal fire was used.

In the chief experiments the steam hammer was employed. Every piece after welding was tested in the usual way for tensile strength, the limit of elasticity, contraction, extension and ultimate strength being determined, the same quantities having been measured for pieces of exactly similar quality, section and length, but without a weld. Both for steel and iron the limit of elasticity is nearly always reduced by welding, and this is, without exception, the case as regards the extension; the contraction of welded is less than that of unwelded pieces when the fracture takes place in the unwelded portion. The general conclusions arrived at are that for steel the best welding temperature is just at the transition from a red to a white heat; a quick fire and smart handling are necessary, as the pieces should not be long in the fire.

Analyses were made of three samples, one of which welded admirably, the second badly and the third not at all. Professor Bauschinger is of opinion that in the case of mild steels, such as those tested, with a low carbon, intended to take the place of bar iron, success or otherwise in welding depends less on the chemical composition than on the mechanical treatment.—*Boston Journal of Commerce*.

SCIENTIFIC PROGRESS.

The Latest Triumph of Science.

The world moves; wonder follows wonder, and each seems more wonderful than its predecessor. The latest triumph of science is carrying on telegraphic communication from a railroad train running at a high rate of speed. The Railway Telegraph and Telephone Co. recently gave an exhibition on the Staten Island Railway of the new method of sending and receiving telegraphic messages on a railway train under full headway. Among those on the train were Senator Leland Stanford, of California; vice-president Sykes, of the Chicago & Northwestern Railroad; David Dow, vice-president of the Rock Island Railroad; Stuyvesant Fish, vice-president of the Illinois Central, and Thomas Edison. A battery was in one of the passenger cars, with a ground wire connecting with the axle of wheels and the track. The other wire connected with the tin roofs of the cars, which in turn were connected by an insulated wire. The common electric magnet worked by a Morse key was used. From the car roofs the messages were transmitted by induction to the permanent wires on the poles along the line of the railway, a distance of from 25 to 35 feet. Messages were sent to and from New York and other points with perfect facility while the train was running at 30 miles an hour. Mr. Edison said the new wonder in telegraphy would be introduced at once on the Illinois Central Railroad. The messages jumped mysteriously from the tin roof of the cars to the ordinary wire strung along the poles; and this service did not interfere with the use of the wires for regular messages at the same time. One of the persons present asked Edison to explain this latest freak of his ingenuity. "It is difficult," he said. "It takes 1000 different electrical discharges from the roof of this car to that wire to send a single word. A single dot is made up, say of 100 atmospheric waves. These are sent separately. From the Morse battery the waves go at the rate of 20 to a second; here at the rate of 600 to 1000 to a second. The electrical communication lasts only about one 250,000ths of a second. Can you understand that? Very well, then. I see you do. To keep the air from being polarized we have to plump the words through quick. I can send a message 550 feet in this way through the air. The current does not go from the battery but from the magnet. This electricity differs from the ordinary electricity about as a fall five miles high would differ from a fall a foot high. It is under very high pressure."

The Progress of Science.

The president of the British Society of Engineers, Mr. P. F. Nurse, in his recent inaugural address said: "The facts I have brought before you also point to the moral and material progress of the world. 'The bee that hummed his busy hour through the bowers of Paradise,' wrote Sidney Smith, 'fashioned its hexagon with the same mathematical precision which it does now and here. Six thousand years have added nothing to the sagacity of this horse or the intelligence of the dog.' But how widely different with man! He commences as a first-worshipper and rises to a Newton, a Faraday, a Stephenson, a Siemens. He tempts the river in a few fragments of bark lashed together with thongs of rawhide, and crosses the Atlantic in an iron steamer of 22,500 tons burden (the *Great Eastern*). He burrows in the earth and then builds a city with 4,500,000 inhabitants. He sticks a dried reed in a lump of fat to light his mud hut, and carbonizes 2,200,650 tons of coal per annum to illuminate London. He takes weeks to send messages on sticks to Montezuma, from the coast, and at last reports in London the details of a battle fought in the Soudan the same morning. He slays his foe with a sling and a pebble chosen from the brook, and meets the enemy with a machine gun firing 600 rounds a minute by means of its own recoil (the Maxim gun). He lays siege to a city with a balista, throwing a fragment of rock, and finally attacks a fort with a gun weighing 110 tons, projecting a steel shell of 1800 pounds, with a charge of 906 pounds of gunpowder. The ax-head that floated for a few seconds on the Jordan 3000 years ago, when the 'iron did swim,' was a miracle indeed. These are the beginnings and endings of science, but they are the endings of science as regards the present only. They are by no means final, as science never stands still. They are but the landmarks of our times, which, as Emerson puts it, are 'trivial to the dull; tokens of noble and majestic agents to the wise; the receptacle in which the past leaves its history; the quarry out of which the genius of to-day is building up the future.'"

THE PHENOMENA OF TORNADOES, to the scientific study of which Lieut. John P. Finley, of the United States Signal Corps, has devoted about eight years, are now so well understood as to warrant the belief that trustworthy warnings may soon be sent out to the inhabitants of localities which may be threatened with disastrous visitations. Daily predictions are, in fact, being made, having begun last year and continued through the tornado season and resumed recently upon the return of Lieutenant Finley from an inspection tour through the West. The

percentage of verifications is already gratifying, though the predictions are as yet largely experimental and are embodied in the daily published bulletins of the signal office only when the conditions are favorable to the creation of the tornadoes they are very pronounced. In such cases "severe local storms" are noted as probable.

The Moon and Photography.

A contemporary philosophizes upon the interesting possibilities in regard to future astronomical discoveries by means of photography, substantially as follows: Photography differs from all other pictures in being an absolutely faithful reproduction of everything within its range. The piercing rays of the sun are absolutely impartial reflecting the exact apparent form and size of everything within range of the camera. This evident fact suggests an interesting thought. If the sensitive plate could be made of such exceeding fine quality as to print accurately the smallest objects conveyed to it by the rays of light, the simple process of magnifying it would enable us to print copies so large that it would be equivalent to multiplying many times the power of the largest telescope. The present limit to the magnifying power of telescopes is the obscurity of the glass which has to be very thick in high powers; but if the magnified object is photographed, and the photograph is of fine enough quality to be itself magnified what wondrous results might not be obtained! An object on the moon the size of a small hill can be plainly seen now; with this improvement the houses and people (if there were any) could be plainly seen. The mysteries of Mars' varied surface, the belts of Jupiter and the extraordinary rings of Saturn, we may hope, will be understood in the near future—a future bright with the scintillations of man's genius which is fairly overturning the world and bringing us into closer harmony with the infinite universe, and fairly opening our ears to the "music of the spheres."

How Rain is Produced.

Did it ever occur to the reader that there is just as much water in the air above on a clear, bright day as on a cloudy or rainy one? Rain does not come from somewhere else, or if it is wafted over you by the wind from elsewhere, the water that was over you is simply wafted on to some other place. Water is absorbed in the air above us, at a certain temperature, and it becomes insensible. Cool that air by a wind draft of cooler atmosphere, or by electrical or chemical influences, and the moment the air becomes cooler it gives up some of the watery particles that were insensible or invisible at the higher temperature. These small particles thus given out unite, and when enough of them coalesce, obstruct the light and show as clouds. When enough of them unite to be too heavy to float in the air, they begin to descend; pair after pair of them come together until a rain-drop is formed. One of these minute rain-drops is made up of millions of infinitely small watery particles.

Air passing over the cold tops of mountains is cooled down so that it gives up a good deal of the congealed watery vapor, and hence little rain falls in the region along the lee side of such mountains. This is why so little rain falls in Colorado, and in other places north and south of that State. The prevailing winds blow from the west, and at the cool tops of the Rocky mountains lower their temperature and thus take out the moisture that would otherwise fall in rain.

SCOURING ACTION OF WATER.—Responding to an inquiry as to the base taken by engineers in calculations of the carrying power of water to determine the scouring action of a river on its bottom, the *Manufacturer and Builder* says: "The carrying or transporting power of water increases as the sixth power of the velocity—a prodigious rate of increase, as may be inferred from the fact that a stream having a velocity six times as great as another, will be able to transport material weighing 46,656 times as much as that carried by the slower stream. The data from which engineers commonly calculate the effect of a scour on a river bottom are about as follows: A stream flowing with a velocity of 3 inches per second barely produces an effect on fine clay; 6 inches per second will raise fine sand; 8 inches per second will raise sand of the coarseness of linseed; 12 inches per second will sweep along fine gravel; 24 inches per second (or 1½ miles per hour) will carry pebbles of about 1 inch in diameter; 36 inches per second (which is about 2 miles per hour, or about two-thirds the rate of speed of a moderate walk) will sweep along fragments the size of an egg."

NOISELESS ANVILS.—If it is desirable to set up an anvil so that its use will make the least possible noise, set the anvil on a block of lead; or make a putty ledge around the anvil upon the wooden block, one-half inch clear all round, one inch high. Raise the anvil clear of the block one-half an inch, by any means available, pour in the lead until it rises above the bottom of the anvil; or set the anvil on a good bed of sand held in a box.

THE EGYPTIAN chariots had line-bolts of bronze and were put together with pins and nails. Screws so far as known were not invented.



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Passing Events.

News again comes from the northwest coast of gold placers having been discovered. Thus far we have only vague reports on which to rely, but as a number of men have gone to the new fields we are well soon learn definitely as to their extent and richness.

The discovery of petroleum in New Mexico is attracting considerable attention, and there is quite an excitement around Albuquerque.

In several places in this State boring is going on in the hope of striking flows of natural gas. In one or two places it has been found, and in others the prospectors are very hopeful of good results.

The manufacture of the first steel armor plate ever made on this coast marks a step in advance in our mechanical industries, and one which may be fruitful of great results.

Work in the Big Bend tunnel, says the Chico Chronicle, is being pushed as rapidly as possible and the big cut will be completed about the 7th of April. There are only about 250 feet to tunnel. Feather river will not be turned into the tunnel until about the 1st of June, as two immense gates and some dams are to be constructed. It is not likely that a demonstration will be made at the tunnel until June.

PHILIP DEIDESHEIMER, well known on the Comstock, is not the Deidesheimer, who, as secretary of a California mining company, is reported as having taken a lot of gold bullion belonging to the company.

Smelting Capacity of Furnaces.

The water-jacket furnaces in use on this coast are generally round but some are oblong, and generally they have uniformly sloping sides. The quantity of ore a jacket of given size will smelt depends upon the fusibility of the charge, the strength of the blast and the supply of water. The three-foot round jacket is usually designated a 30-ton furnace. Under exceptionally disadvantageous circumstances, a furnace of that size will smelt only 20 tons; but with fair ore and good management, as at the Copper Queen, Arizona, and elsewhere, it smelts 45 to 50 tons a day. On the very fusible ore of the Old Globe mine, at Globe, Arizona, as much as 56 tons a day have been put through a three-foot furnace, and even this quantity has been exceeded by a furnace at the Verde.

Unless the ore is refractory, Mr. James Douglas, Jr. considers that 45 tons of mixture should be smelted under a blast of 10 to 12 ounces, produced by 100 to 115 revolutions of a No. 4½ Baker blower, provided the supply of water is ample. The latter condition is essential. To keep a three-foot furnace cool under a high blast from 37,000 to 40,000 gallons of cool water must be passed through the jacket daily under a head of not less than 10 feet.

Round furnaces of a greater diameter than three feet, if the ore is favorable, will smelt more than smaller ones, though not generally in proportion to their area. Oblong furnaces, whose shorter diameter does not exceed three feet, come nearer to the duty of the small round furnace, area for area, than do large round furnaces. If the ore is not free smelting, a furnace of greater diameter than three feet is very liable to become deranged with the formation of a core. If, however, the mixture is fusible, and does not contain much fine ore, the blast of a blower of No. 4½ will penetrate to the center of a four-foot furnace, though a No. 6 is preferable where furnaces of that size are used.

The advantage of a small furnace over a large one is that it is more manageable, and if it becomes hopelessly deranged it can be blown out with less cost than a large one. On the other hand, the record of the Detroit large rectangular furnace, according to Mr. Douglas, shows a slight saving in fuel over the small furnaces, though this is not the case with the large round furnace of the Arizona Copper Company. Up to a certain point the staff necessary to handle the charges and slag of a small furnace would handle a somewhat larger quantity. There is therefore always an economy in this item, but unless the ore is very fusible and invariable in its contents this advantage is more than balanced by liability to derangement.

Steel Vessels.

The Union Iron Works of this city, in order to demonstrate their ability to build armored vessels on this coast, have prepared a steel ingot weighing 17,000 pounds, which, fashioned into a plate will be sent to Washington, in order that the Secretary of the Navy may test it with heavy shot. The plate is ten feet long, three feet wide and ten inches thick. This week the delegation of Congressmen who came to the city as escorts to the body of the late U. S. Senator Miller, visited the Union Iron Works and Pacific Rolling Mills, so that they would see for themselves the extent of their plants, and judge of the capacity of the works.

The boiler shop, machine shop, foundry, and all the departments were inspected with no little interest and the party then proceeded to the rolling mills. Ten tons of steel had been prepared, and at 12 o'clock the signal was given and it poured out from the immense receptacles, over the furnaces, into a ladle swung from a derrick. The metal was then run into molds, and the various processes were thoroughly explained by Mr. Scott and Mr. Benchley. The facilities for building and launching of vessels were examined to the satisfaction of the visitors. One vessel for the Government is now under way at the shipyard of the Union works. She is being built of steel and will take the place of the steamer General McPherson in use on this bay, plying between the different islands and points where there are fortifications or barracks. It is to be hoped that if the Government builds a cruiser for this coast, as is the intention, that the work be given to contractors here, as we are as well able to build it as all other centers of iron industries.

California Laboring Classes.

An Eastern correspondent asks us a few questions about the California laboring classes, which can be answered briefly, as follows:

It is pretty well acknowledged that even taking into consideration the slightly higher cost of living, the wage-earners of California have decidedly the advantage of their Eastern brethren, not only in the amount of pay received, but in other ways as well. This is in a comparative sense, of course, since in some branches the pay is better elsewhere. There is one thing, however, the mechanic or laborer here in this State lives far better than those of his class East. Even in this city there are no houses like the "tenements" of the East. Nearly every family has a house to itself, and few have less than three rooms, and rents are not excessive. The mild climate admits of people enjoying life all the year round, and stoves are mainly useful for cooking. The houses do not have to be built expensively to guard against severe cold in winter, and temperate, industrious men have less difficulty here than elsewhere in becoming the owners of a home.

The necessities of life can be had here cheaply. Flour, beans, potatoes, fruits, fish, tea, coffee, rice, etc., are very cheap, though the prices are higher for groceries, meats and vegetables. The vegetables ought to be a great deal cheaper than they are, as they are easily raised.

Clothing, too, is not as cheap as it should be, though costing less now than was the case a few years since. We raise plenty of wool, but it is all sent East and made into clothes, which are sent back here and sold. Amusements are here in abundance, and as Sunday in this State is recognized largely by the working classes as a day of recreation, as well as rest, they go into the open air and to various pleasant resorts within reach of the cities. It is not found necessary in this State, to as large an extent as elsewhere, to make the children of the family work in factories, mills, etc., to add to the earnings of the bread-winner. The average parent is unwilling that his children should work if he can help it, and the children of the mechanics and other wage workers accordingly attend the schools for years longer than in older communities.

Compared with Eastern cities, we have had very little difficulty from "labor troubles" in California, the main complaint from the laboring classes having been the presence of Chinese in the communities, who work for very low wages. In some branches these people have driven the white laborers out, and the present agitation is the direct result. When this subject is favorably settled, the wage worker in California will have very little, if any cause of complaint, and can congratulate himself on his place of residence.

Fineness of Grinding in the Patio Process.

The Mexicans, in grinding ore in an arastra, when it contains gold alone, find that it is not profitable to grind it finer than a certain point, but silver ore is ground much finer, especially where there are sulphurets. They get a higher percentage by grinding the sulphurets fine, since in the subsequent operation on the patio, turning them over and over, causes more rapid oxidation by presenting new surfaces. A charge is ground from 12 to 72 hours, according to the class of ore. In many places they grind for only 10 hours, but it is usually got into a state of slime before being put on the patio.

Mr. E. C. Van Blarcom, who examined the details of the patio process while at Guanaguato, took some of the pulp from the patio for the purpose of seeing how fine it had been ground by the arastras. It was dried and then screened. The result was that 97.15 per cent passed through a 100-mesh screen, 1.44 per cent through a 60-mesh screen, and the residue was 21, making 98.50, the loss being due to imperfect drying of the sample. This very fine grinding had been done in 36 hours by the arastra. The ore was worked for gold and silver.

THE Cedar Mountain chrome mines, near Livermore, are shipping quantities of chrome ore to Philadelphia by rail, owing to low rates of freight. About 30 tons a day are hauled to the railroad station.

LARGE quantities of redwood are being shipped from Humboldt county to Australia.

Mills on the Carson River.

A Grand Revolution in Milling Ore.

[Written for Press by J. B. P.]

The greatest advantages are frequently derived from the simplest agencies at command. The use of hydraulic power in working pumps on the Consolidated Union is a fair illustration of this. No other power could well take its place; it meets the demand with a simple, unmodified element—water, and brings into play, with the least complication of machinery, 1500 pounds of power to the square inch. Such is the simplicity of mechanism employed to produce this result that in the opinion of the head foreman, Mr. Chas. Matheson, these pumps on the Norcross, located from two to three thousand feet below the surface, would still ply their work without interruption for days, even though they should be drowned in hundreds of feet of water, in case the mine should be accidentally flooded. Over 20 years since an idea was set afloat in Colorado that some new chemical preparation had been discovered whereby ores of the most stubborn and unrefractory nature could at once be dissolved, and the mineral be gleaned from the pulpy mass with the smallest amount of trouble and delay. Thus, the hammering and the pounding and the thundering of the old fashioned quartz mill would disappear forever. We watched and waited patiently for some further development in that direction, but as more than 20 years have now elapsed since the discovery was presumed to have been made, and we find nothing of the sort working to the relief of the miner about Leadville, Tombstone or the Comstock, we are much inclined to believe that the new discovery was prematurely announced, and that it shared largely in the aerial, akin to the theory of metal deposits by surface agencies, and therefore is an exploded thing of the past.

But as the hammering still goes on, it has appeared eminently desirable that some method, device, or plan should be brought to the front whereby the enormously expensive process of extracting the metal from the ore already crushed, might be obviated. Nothing having been accomplished for nearly 25 years in the direction of rock pounding, it did seem possible that something could be achieved, in saving the metal from the pulp, to a much greater extent than it has been done, and of curtailing the overwhelming expense involved in saving any metal at all. The simplest and cheapest part of the work, now, is the crushing of the rock, the after process to get at the metal, incurring, by far, the greater bulk of expense. Many ingenious contrivances have been put forth to meet this want, none of which, however, until very recently, seem to have materially altered the grade of expense. The animated contest that has been awakened recently, in respect to concentrators, and the sharp rivalry that has sprung up between the "Frue" and "Triumph" as advertised in the MINING AND SCIENTIFIC PRESS, shows the anxiety and eagerness of the several inventors to be counted ahead, in the points of economy and success in treating ores. The agent for the Frue was engaged in the work of setting up that pattern, as we entered the Santiago mill on the Carson river. We had the pleasure of discussing with him the various inventions of this order, as well as some of the peculiar advantages which the Frue is represented to possess above all others, but were unable to remain until his machine could be got in working order. Whilst we were in Gold Hill, on a second call at the Alta mine, we were shown a simple piece of mechanism by the chief engineer, Mr. Phillips, which struck us as a product of the inventive faculties of that gentleman, likely to work a total revolution in this department of mining. The agency used by him was simply water, the same instrument of power that enables the miner to get at the richly freighted ore on the 3200 foot winze of the Norcross. The simple and only instrument used by him was the common syphon. Mr. Phillips illustrated the principle of his invention by employing 100 well-made bullets, of an ordinary size, 50 composed of lead, and 50 of tin. These were dropped into the shorter arm of the syphon by a short side tube inserted near the open orifice. The lead bullets, without exception, immediately fell to the bottom of the tub of water, now being emptied by the syphon, and were caught in a basin, whilst the tin bullets were carried up

through the syphon and dropped into a vessel on the outside of the tub, which was receiving the water. The next step in his experiment was the sifting, with a spoon instrument, a quantity of crushed ore into a simple apparatus surrounding the shorter arm of the syphon, and a similar result followed, of a still more interesting and beautiful order. The metal went to the bottom of the tub and was caught in a sancer, whilst the sand and raff of every description went up through the syphon, and was deposited in a vessel receiving the water on the outside.

Of the eight different siftings of crushed ore that were experimented upon, the finest, or eighth, appeared to show up the test with the greatest perfection. But a few days elapsed after witnessing this experiment before we were at the "Brunswick" mill, on the Carson, where that polite and efficient officer, Mr. W. H. Armstrong, superintends the running of 56 stamps in that finely constructed plant. We had heard considerable about the new concentrator, called the Golden Gate, being introduced at the Brunswick mill whilst we were in Virginia City, and were anticipating some new departure from the old ruts of the past in regard to separating ores. Our surprise was complete and most gratifying, when, after glancing over the machine, we found the same element at work, viz., water, and the same principle involved, to wit, suction, as we had noticed but a few days previous in the experiment at the Alta mine. The method of separation at the Brunswick differs from that of Mr. Phillips only in one particular; the suction in the one case is wrought by a syphon, and in the other by an air pump. Only one of these machines was in use in the mill when we were present, but so successful had it proved that four more had been ordered and would be at work in a few days. These machines are so simple as hardly to require an extended explanation. What has been said in regard to the process of the syphon as an ore separator will apply here, only on a larger scale. A long extended and broad metallic plate, over which the newly crushed ore from the mill is passed in one direction by a jiggling process of the plate, whilst a sweeping current of water of thin dimensions is sent in the opposite, constitute the main features involved. The lighter material is lifted from near one end of the plate by suction lips and carried from the mill as dead waste, whilst over the edge of the opposite end of the plate the mineral is shucked into a large metallic bath ready to receive it. Mr. Armstrong grasped an iron ladle and thrusting it into the bath drew up a pound or two of this metal. The glittering display showed at once what was being done by the water process, without the aid or presence of that most costly article, quicksilver. Mr. Armstrong avers that 95% of the metal, or even more, is saved by him with this process, and in several instances the full assay value has been secured.

Mr. Mackey remarked, when witnessing the experiment of the syphon, that, had the discovery been made fifteen years sooner, he would have been saved more than a million of dollars in quicksilver alone. From the statement recently published, in connection with Prof. Rae's project on the Carson, that \$41,000,000 were now lying somewhere in the bed of that stream, as something of an approximation of what the quicksilver had carried off from the mills, we can in some measure estimate what a prodigious waste has gone on in all the quartz mills of this country during the past quarter of century. By this new process all free milling ore has found an exit, and relief from the crushing weight of expense heretofore involved in its reduction at the mills, and unquestionably the greatest benefit will accrue to mining men everywhere, especially in the lower graded ores. Whilst mill owners may not receive so large a share of all that comes from the ore, in custom work, yet the absence of that very costly article of quicksilver will vastly cheapen the process, and his profits will be as great as before, whilst the hard working miner will fairly be reimbursed for all his outlay of toil and expense.

The bullion shipment from the silver mills of Butte, Montana, for the month of February, 1885, amounted to \$306,540. For the same period this year the shipments were \$332,480—showing an increase of \$25,940.

The strike among coal miners at Liege, Belgium, has assumed large proportions.

Electric Power for Mines.

Sometime since we stated that it was the intention of Prof. Keith, of this city, to arrange plants in some parts of our mining regions, where water-power was to be had, so that by means of electricity the power could be utilized at a distance for operating machinery at the mines. Other things have occupied his attention, principally electric lighting, and the scheme has not been carried out in this State. We see, however, by the *Virginia Chronicle*, that a company called the "Comstock Dynamo Electric Light and Power Co.," has been organized in Nevada, and has secured a water right on the Truckee river, where a dynamo machine will be set up to transmit power for the purpose of illuminating the Sutro tunnel and the Comstock mines, and furnishing motive power for quartz mills to be erected convenient to large deposits of low grade ore.

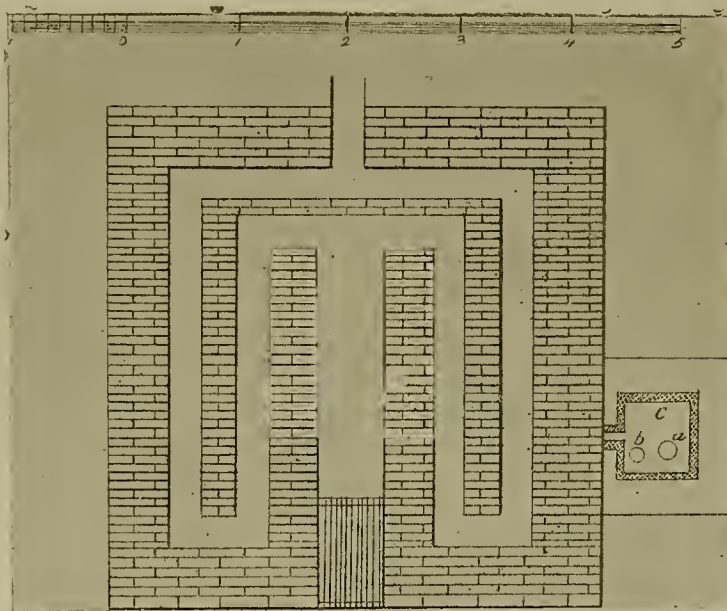
A dynamo machine will be set up on the Truckee. The power will be furnished by a Lefel wheel, propelled by the full head of water in that stream with a 100-foot fall. The power will be transmitted over a copper wire one-quarter of an inch in diameter to a receiving dynamo. This receiver will be connected by belting with the cam shafts in the mill. It is claimed that only 20 per cent of the motive power of the turbine wheel will be lost in transmission. The actual cost of driving a 100-

Gas and Oil.

In many places in the State at this time prospecting operations are going on for natural gas and oil. At the great Brea rauchos, in Southern California, where we obtain most of our asphaltum, a company is spending considerable money in prospecting for oil, with good chances of success. At Livormore, Alameda county, and near Parissima, San Mateo county, wells are being sunk for oil. In Ventura and Los Angeles counties, where there are already many good wells vigorous prospecting is being carried on.

A company has been formed for prospecting for natural gas in Fresno county. The managers are now trying to secure the lease of lands for a term of years upon which to sink wells for the purpose of reaching a reservoir of natural gas believed to exist in one of the valleys, at a depth of some thousand feet below the surface. The capital stock of the corporation is fixed at \$10,000,000, and the enterprise is being prosecuted mainly by Eastern capital. Upon the favorable terms offered, the company is having no difficulty in securing leases in this county. The following large land owners have already executed leases: Dr. E. B. Perrin, Thos. E. Hughes, M. J. Church, J. R. White, J. G. James, P. D. Wiggiton, J. B. Campbell and others.

At Los Angeles they have been sinking a



SOLUTION TANK FOR THE COPPER CRYSTALS WITH SILVER.

stamp mill by this method, it is said, will not exceed \$200 per month. The cost of transportation of Comstock ores to the mills on the Carson river foots up nearly \$1000 per day.

By building mills adjacent to the mines this sum will be saved as well as the cost of handling the ore over three different times as at present. The projectors of the enterprise claim that ore assaying less than \$3 per ton can be worked at a profit by the cheap system of handling which they intend to introduce. The cost of the plant for this great enterprise will not exceed \$30,000. The company's plan includes the lighting of the city by electricity and the running of a line of street cars from Virginia to Gold Hill, to be propelled by an electric motor. The machinery for the plant has been ordered from Eastern manufacturers and is now in course of construction. The cost of laying the wire between the Truckee river and this point is estimated at \$200 per mile. The wire will be stretched as the crow flies, and will be only eighteen miles in length.

By crushing and concentrating their ores the Paradise Valley Mining Company are so able to reduce the bulk of the crushed rock that one ton contains metal to the value of nearly \$500. Thus they are able to send the concentrated material to the Selby works, California, for smelting. There are doubtless scores of mines in all parts of Nevada that could be made to pay were there facilities for cheap crushing and concentrating. Miners may themselves ascertain whether their ores will pay when so handled by crushing a given weight, concentrating it in a pan, and then obtaining an assay of a fair sample.—*Silver State*.

well in the yard of the United States hotel, and are down about 955 feet. The well was started for artesian water. The other day they struck a vein of brackish water—not a flow—with some gas. They lighted the gas, but it soon died out. It is the belief of the owners that by going deeper they will strike oil or gas in quantities, and work is still continued in this expectation.

Mining Accidents.

Private advices from Pinal, Arizona, report a fatal accident in the Silver King mine. Several tons of ore caved in, killing instantly a miner named Bauman. John Stanfield is expected to die at any moment, his back and both legs having been broken by a boulder weighing 600 pounds.

An accident occurred this week near Santa Maria, 25 miles from Groveland, on the Yosemite road, by which Luigi Defforari was killed and his brother Augustine had a leg and arm broken. They were ground-slucing and the bank caved down on them.

While at work shoveling at the mines in Pennsylvania district, Nevada, a slab of dirt fell from a shelf, striking Robert Husband on the head and arm. The arm was broken just below the elbow and he was slightly cut on the top of the head. He was brought to town, had his arm set, and is now doing well. On the same day, while employed fixing the mill, James Clark had his thumb mashed by a piece of iron falling on it.

Andy Sawyer, a miner working in the Conductor mine, at Gold Hill, N. M., lost his eyesight by the premature explosion of a blast.

On Friday of last week a miner named James Leary, employed in the Empire mine, Grass Valley, was caved on while working in one of the drifts. A mass of rock and earth fell on him, dislocating his left ankle and bruising him otherwise so that he will not be able to work for some time, both legs being bruised badly.

Silver and Gold From Black Copper.

No. 3.—The Copper Sulphate Crystals.

As the crystals contain all the insoluble as well as the soluble materials, they must be dissolved and recrystallized in order to separate them. The solution-tanks and crystallization-launderers are all situated on the upper story. Between this upper story and the lower ones the boilers for making the steam are placed. Across a passage, about two meters wide and above the boilers, are three tanks 3.20 meters square and 0.60 meter deep (see engraving), heated by furnaces for dissolving the fine crystals. The solution is 0.50 meter deep in the vats, and they are covered. The vats are lined with lead and are heated by an arched furnace, the fire of which is made to circulate twice on each side of the fire place by flues which join behind it. The fire place itself is arched with brick and covered with iron plates. These plates are 0.96 meter by 1.15 meters by 0.015 meter thick. They are the same plates which are used round the works for flooring.

These vats connect at the bottom by a short spout with a launder on the outside, in which there are two pipes, closed with conical stoppers. One of these is on the level with the bottom, and serves to empty the mud collected there. The other, raised a little above it, is used for drawing off the clear mother liquor. This mother liquor from the last crystallization in the tanks below is pumped up into them so as to be about 0.40 meter deep and heated to from 70 degs. to 76 degs. R. It is diluted with water until it is at from 15 degs. to 18 degs. B. Only about half of the mother liquor is used for this purpose. The other half is pumped up to be used in dissolving the granulated copper. The crystals are then added. It is not allowed to concentrate beyond 26 degs. B., as the crystals which are produced from a more concentrated liquor are too small to be easily sold. The fire is drawn when the solution is made. While the solution of the crystals is going on the liquor is kept constantly stirred with wooden rabbles 0.30 meter long by 0.20 meter wide, with a handle four meters long. As a very small quantity of silver goes into solution with the copper crystals, it is necessary to precipitate it. This is done with the very fine shot copper which is produced when the copper is granulated for solution, which precipitates all the silver. In order to prevent any loss of heat the tank is covered with a hood and the surface of the liquor protected with boards.

When the solution has taken place, the liquor is left until it settles, which will generally take about 12 hours. During this time it cools down to about 65 degs. R., and falls to 29 degs. B. It must not be allowed to go below this temperature, as there would be danger of small crystals forming. It must therefore be made to cool as slowly as possible, so as to prevent its being too cold when it comes to the crystallization tanks.

Our Correspondents.

Aside from the general contents of the *PRESS* this week, there are two letters from our special correspondents, one from Nevada and one from Montana, which deserve special perusal. Mr. Huston has been traveling through Idaho and Montana in the interest of the *PRESS*, and gathering for our readers a great deal of information of value and of passing interest. From his letter may be gathered a very good idea of the condition of mining affairs in that prosperous Territory. The letters of our Nevada correspondent, of which that of this week is the sixth, have also been very good indeed.

We shall always be very glad, indeed, to receive communications from any of the districts or camps of the coast relative to the mines and general progress. It need not deter any one because they are not practiced in writing, for if the facts are stated we can prepare the letters for publication. We are always pleased to receive letters from our friends in the mining camps.

ENGINEERING NOTES.

THE PANAMA CANAL.—Lesseps is truly a wonderful man. Any other engineer would succumb at once under the terrible drawbacks which he is meeting with in construction of the Panama canal. But Lesseps appears in no wise discouraged. From all indications he will gain a favorable report from the engineer which the French Government has sent over to examine the work. Although nearly as much money has already been spent as was at first contemplated for the entire cost, with only thirty per cent of the excavation made, he will undoubtedly get the large additional sum for which he now asks. That spent, or even the half of it, there will be no going back in the matter. It will be cheaper to go on and finish than to entirely lose that which will then have been paid out; for all agree that the work can be done. There are no impossible engineering difficulties in the way—all that is needed is money, and the French people will "go their bottom dollar" on De Lesseps' word. The grand old man says the canal will surely be completed in a reasonable time, and when done he proposes to charter a first-class steamer, on board of which he will embark with his family and friends, steam out of some French port, cross the Atlantic and be the first to pass through the canal. That done he will return to France via the Isthmus of Suez, and, let us hope, take in San Francisco on the trip. Such an event will most gloriously crown the life of one of the most noted and energetic engineers which the world has ever produced.

A SHIP CANAL THROUGH OHIO.—A plan for the opening of a ship canal from Cleveland to the Ohio river has been perfected and surveys partially made. The route to be taken is the Ohio canal and Muskingum river. With this connection completed, a ship canal will be opened from New York to New Orleans via the Erie canal, Lake Erie, Ohio canal, Ohio and Mississippi rivers. The main part of the work will be from Trenton, Coshocton county, to Cleveland, along the Ohio canal, a distance of 106 miles, which will cost about \$10,000,000. The Muskingum branch is now in condition for its new uses, save some dredging, and the matter will be duly represented to Congress. By this route ships would have to pass through only about 100 miles of canal from Cleveland to the Gulf of Mexico.

SHIP CANAL STATISTICS.—The largest ship canal in Europe is the great North Holland canal, completed in 1825. It is 124 feet wide at the water surface, 31 feet wide at the bottom and has a depth of 20 feet; it extends from Amsterdam to the Helder—60 miles. The Caledonia canal, in Scotland, has a total length of 60 miles, including three lakes. The Suez canal is 92 miles long, of which 66 miles are actual canal; it is 26 feet four inches deep, 72 feet 5 inches wide at the water surface. The Erie canal is 463 miles long; the Ohio canal, Cleveland to Portsmouth, 332; the Miami and Erie, Cincinnati to Toledo, 306; the Wabash and Erie, Evansville to the Ohio line, 374. The Panama canal is to be 45½ miles in length.

NEW MODE OF PROPPELLING.—Capt. John Giles, a practical mechanic, claims that a much higher rate of speed can be had by changing the position now given to the propeller at the stern of the ship, as well as its inclination or dip. He would put the propeller under the ship and just forward of the mizzen mast, giving it an inclination of 45° with the plane of the ship's motion. With a propeller thus situated, he believes he can get forty knots an hour where now only twenty are had. The theory is based upon the manner of propulsion of animals, in which, as we know, the efforts of propelling impulse all radiate at an angle from the line of motion.

THE BROOKLYN BRIDGE CABLE IS WEARING. When it goes, it will cost \$7000 for another. A better grip would have been easier on the cable and on the public. The cable should be long enough to arrange for switching the trains thereby. The switching engines are a "give away" on the cable design.

TURNING GRAY.—Many persons begin to show gray hairs while they are yet in their twenties, and some even in their teens. This does not, says a medical writer, argue premature decay of constitution. It is purely local phenomenon, and may co-exist with unusual bodily vigor. The celebrated author and teacher, George Borrow, turned gray before he was thirty, but was an extraordinary athlete at sixty. Many feeble persons and others who have suffered extremely both physically and mentally, do not bleach a hair until past middle life, while others, with no assignable cause, lose their capillary coloring matter rapidly when about forty years of age. Race has a marked influence. The traveller Dr. Orhigny says that in the many years he spent in South America, he never saw a bald Indian and scarcely ever a gray haired one. Negroes turn more slowly than whites. In this country sex appears to make little difference. Men and women grow gray about the same period of life.

OWING to the largely increased travel over the Central Pacific, consequent upon the immensely reduced rates, the eating stations are taxed to their utmost capacity.

USEFUL INFORMATION.

What Is Soda Water?

Soda water is ordinary drinking water, impregnated with carbonic acid gas under pressure, usually sweetened with flavored sirups, and cooled to render it deliciously palatable and refreshing. Without sirups it is generally sold by druggists in siphon bottles as carbonic acid water, and is prescribed and recommended by all physicians as beneficial and healthful.

How Soda Water is Made.

Pure water, free from chemical or organic impurities, is the first requisite. Injurious chemicals dissolved and held in solution are invisible and often occur in the brightest and clearest spring water, rendering it unfit for use in making soda water. Chemical analysis only can detect them, and such water should not be used. Organic impurities held in suspension can readily be removed by filtration. To obtain the gas for mixing with the water, a compound of carbonic acid and lime (usually marble dust) is placed in a generator with sulphuric acid, which last combines with the lime and displaces the carbonic acid which is liberated as a gas. The gas accumulates under pressure, and is conducted from the generator through a purifier to a receiver about two-thirds full of pure water. By agitation the contents of the receiver are thoroughly mixed, the pressure raised to about 150 pounds to the inch, and the fountain is ready to attach to the cooling box for use. Bicarbonate of soda was originally used in the making of "soda water," hence its peculiar name. "Carbonated" would be a more appropriate name, now manufactured. The sirup should be flavored only by true juices, or by extracts made from the natural oils, expressed from fruits, etc. Artificial chemical flavorings are common, but dangerous. The New York and Brooklyn Boards of Health have passed rigorous ordinances, and are taking steps to stop the sale of the poisonous trash so often sold as "soda water" by unscrupulous dealers, and even by some druggists of popularity and reputation. Impure soda water is often the result of using polluted water, impure gas, deleterious sirups, etc., but the greatest danger arises from improperly constructed reservoirs for holding the "soda water," from metallic contamination in the coolers, pipes and connections. Pure "soda water" should keep good indefinitely if stored in pure block-tin fountains, encased by steel.

STOVES IN HOLLAND.—The stoves there are a curiosity, although there are a few of German and French manufacture in use, that are more modern in model. The real Holland stove consists of a cast iron pot with a hole in the bottom in which sits a loose grate and so loose is that woe he unto the fire maker that pokes too strongly. Even a good draft is apt to upset the whole business into the air pan. The fire pots set in a box of sheet iron with a hole in the side to admit the pipe to the pot and one in the front for draft. They are not provided with anything like a damper. The more expensive kind are made fine with much open work of cast iron; others have a top of marble, white, gray or black, while the most expensive are encased in tiles of old Delft. It is unnecessary to say these stoves, "kachels" they are called, give very little heat, so little in fact that people of all classes use a sort of heater, similar, I think, to the kind that our grandmothers used to carry to church with them, consisting of a wooden box or foot stool lined with zinc or brass, the top well perforated; inside is an earthen pot filled with turf or charcoal, which has been first "burned off" in a kitchen fire. Ladies making calls here in the winter are at once supplied with such a "stove." The kitchen stove is on the same plan as the others, only the sheet iron box is larger to give more space on top, which has many different sized holes, each with a sheet iron cover, to which is riveted a long handle, giving it a strange appearance. There is only one place on these "kachels" where anything will boil, that being directly over the fire. If more than one kind of vegetables are to be prepared for dinner they must take their turn over the fire and then be set back to keep warm. The oven is practically of no use as there is no way of heating the sides or bottom.—Delft Correspondence.

A NATIONAL DIRT MINER.—A man by the name of Clark on Capitol Hill has gone to a good deal of trouble for a little notoriety, and deserves all he can get. It occurred to him that it would be a good idea to mix the soil of all the States and Territories in the Capitol Park, and about a year ago he wrote to Postmasters and other officials from Maine to Arizona. In reply he received a package of earth until his collection was completed. Then on Washington's birthday, he mixed the earth up in a box and dumped it in a corner, where our national flower, if we ever have any, ought to be sown.

A DECORATED GOBLET.—An interesting home-made method of natural decoration consists simply in taking a glass or goblet and placing in the interior a little common salt water. In a day or so a slight mist will be seen upon the glass—hourly this will grow until in a very short time the glass will present a beautiful appearance, the glass being enlarged to twice its thickness, and covered with beautiful salt crystals packed one upon another exactly like some

peculiar fungus or animal growth. It is necessary to place a dish beneath the glass as the crystals will run over. The glass can be made additionally beautiful by placing in the salt and water some common red ink; this will be absorbed, and the white surface covered. No more simple method of producing inexpensive or beautiful ornaments can be imagined, and by using different shapes of vases and shades, an endless variety of beautiful forms can be produced.—Scientific American.

"HORSE SENSE" is well illustrated in the way that some of them perform their duties on the top floors of New York warehouses, where other power is not available, in the work of hoisting goods to the different floors. In one case a horse has thus been kept at the top of a high warehouse for eleven years, without having been down to terra firma but twice in the whole time. The horses are directed when to pull and when to stop, pulling by the sound of the check rope when shaken from below, to which they invariably give a prompt attention that might well be imitated by many workers in a higher field, but otherwise they are always left to themselves.

COPPER-LINED TANKS are often known to give trouble by leaking, after a few years, much of which arises from the manner of soldering. Most plumbers use common solder, made of lead and tin. For this kind of work, pure tin should be used, and the lap thoroughly sweated through. The nails should also be of copper.

SPEED OF ICE BOATS.—It is stated by the *Scientific American* that a first class ice boat, sailing on first class ice, will move from three to four times faster than the wind that drives the boat. For example, a wind having a velocity of fifteen miles an hour will drive the boat at the rate of from forty to sixty miles an hour.

HARD AND SOFT JOURNAL BEARINGS.—Mr. Barr, of the C. & M. & St. P. Ry., says that very soft bearings lose nearly 40 per cent less weight than hard brass or bronze per 1000 miles run. The journals under soft bearings decrease in diameter nearly twice as fast as those under hard bearings.

CATHAY was the old name for China, so called by the Venetian traveler, Marco Polo, who, in the employ of the Khao of Tartary, visited it early in the thirteenth century. It was the land Columbus expected to find by sailing westward from Spain.

CROWN AND FLINT GLASS.—The difference between crown glass and flint glass consists in the composition—crown glass being composed of silica, potash and lime, while to these ingredients is added about 40 per cent oxide of lead for flint glass.

GOOD HEALTH.

The Administration of Medicines Before or After Meals.

The *Philadelphia Medical News* lays down the following general principles: Medicines that are irritating should be given when the stomach is full, unless the chemical changes which must then occur will destroy their qualities. Mineral remedies, such as the salts of copper, zinc, iron, and arsenic, should be given after meals unless local conditions require their administration in small quantity before meals. Of the latter, arsenic affords a capital illustration. Large doses, acting as an irritant, should follow food, which protects the mucous membrane; but small doses, intended to act upon the stomach terminals of the vagi, must be given when the organ is empty. Oxide and nitrate of silver, intended for local action, should appear in the stomach during its inactivity, lest, at other times, chemical reactions destroy the special attributes for which these remedies are prescribed. Iodine and the iodides given on an empty stomach promptly diffuse into the blood; but if digestion is going on, the acids and starch form products of inferior activity, and thus the purpose which they were intended to subserve is defeated. Substances prescribed to have a local action on the mucous membrane, or for prompt diffusion unaltered, are preferably given before meals. Active medicines, in doses near the danger line, are more safely administered after meals.

Probably the most important questions connected with the period of administration of remedies are those affecting the acidity and alkalinity of the blood and urine. First, as to acids. An acid taken into the stomach before digestion begins will determine, by the laws of osmosis, a flow through the intervening membrane of the alkaline constituents. Hence, when there is an excess in the formation of the acid constituent of the gastric juice, an acid may be given before meals to check the osmosis stomach-ward of the acid-forming materials. When the alkaline condition of the blood and urine is alike in excess, when shall acids be administered? Obviously, in the interval between the digestive acts; for then, the stomach being empty and the veins flaccid, the most favorable conditions for the diffusion of acid into the blood exist. Alkalies require different handling. It is a matter of quite common observation that an alkali, as the bicarbonate of soda, will quickly relieve the excess of acid

by neutralizing it; but it is equally true, although not so clearly recognized, that the relief it is purchased is at the expense of a continually increasing recurrence of the same malady. It may then be affirmed, as a rule of practice, that the habitual use of alkalies to relieve an excess of acid is unwise and hurtful. Alkalies are used to increase the formation of acid when the gastric glands perform this duty inadequately. An alkaline given before meals diverts to the gastric glands, by the laws of osmosis, those materials in the blood out of which the acid constituent of the gastric juice is elaborated. There are two periods when alkalies may be used to lessen the acidity of the urine—just before meals, when the acid-forming materials in the food diffuse into the stomach glands, and the alkaline medicament diffuses into the blood and outward into the urine; and after digestion is completed, when the alkalies diffuse directly into the blood, without interference from the contents of the stomach. Again, there are remedies which should be given with the meals, such as food adjuncts, and medicines required in the process of tissue construction. Wine intended to act as a food is most beneficial when taken slowly during the course of the meal. The objection as regards the ill effect of alcohol on pepsin is not applicable, except to the stronger spirituous wines in large quantity. Iron, phosphates, cod-liver oil, malt and similar agents should, as a rule, go with food through the digestive process and with the products of digestion enter the blood.

HEALTH AND LONG LIFE.—Thousands of people annually ruin their constitution by swallowing too much medicine. It may seem a very strange thing for a medical man to say, but it is nevertheless a fact. It is a dangerous thing to fly with every little ailment to the medicine chest. The use of tonics, unless under medical advice, should be discounted; a tonic is sharper than a two-edged sword, it is a tool that needs to be used with caution. There are now, I am sorry to see, some aerated waters coming into use which contain the strongest mineral tonics, that are apt to accumulate in the system with the most disastrous results. They should, therefore, not be drunk *ad libitum* as to quantity, or without guidance as to quality. Rest should be taken with great regularity. One day in seven should be set apart for the complete rest of both body and mind. Independent of this, all who can afford it should take an annual holiday. Traveling is quite cheap, and two weeks or a month's relaxation from care and business cannot make a big hole in the purse of one who works all the rest of the year and knows how to economize time. Innocent pleasure and wholesome recreation conduct to longevity. All work and no play sends Jack to an early grave. Recreation is to the mind and nervous system what sunshine is to the blood. As a physician, I must be allowed to say just one word about the calming, quieting effect of religion upon the mind. The truly religious make by far and always the best patients, their chances of recovery from serious sickness are greater, and so is their chance of long life, simply owing to the power they have of submitting themselves quietly, yet humbly and hopefully, to whatsoever may be before them.

THE GROWTH OF THE HUMAN BODY.—It has occurred to a Danish pastor in charge of a large institution for children to observe the process of their growth, and to endeavor to ascertain the laws by which it is determined. He has now been engaged on the subject for five years, weighing and measuring some one hundred and thirty children daily during all that time. The children are measured once a day, but they are weighed four times—in the morning, before and after dinner, and at night. Mr. Hansen asserts that the figures thus obtained prove the existence of three well-marked periods of growth in the year, further divisible into some thirty lesser stages. Bulk and weight are acquired between August and December. From December to April there is a further increase, but at a greatly diminished rate. From April till August the weight and bulk gained in the spring period are lost; so that at the beginning of August the weight is almost the same as at the close of the previous December. The growing period, on the other hand, is in the spring and early summer; so that the two processes do not go on together. Mr. Hansen believes that similar laws are discernible in the vegetable world. Be this as it may, he has accumulated a valuable mass of statistics on an interesting subject, and one which hereafter may yield practical results. Food and clothing presumably play an important part in growth, and possibly admit of adaptation to the very natural determination of the vital energy at different seasons.

HURRY AND WORRY.—Some men are in incessant action, early and late and all through the day. They have no time for family or friends. As for holidays, the less for them the better. They have inherited a nervous temperament, and are doing just the wrong thing with it—allowing it to hurry them to an untimely end. They wear themselves out. Their brain is ever in a state of morbid activity almost like that of an insane man. A little careful planning and a proper laying out of work, and especially doing everything in the proper time, would avoid all such hurry and worry, make work much easier, secure an abundance of leisure and greatly increase length of life.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ANOTHER STRIKE AT THE MOORE.—Amador Dispatch, March 17: We are informed that a 20-foot ledge of fine ore was struck in the Moore mine a few days ago. This is now considered one of the most substantial mines in the county. Work at the Kennedy mine is being pushed forward in a vigorous manner, and we hope soon to be able to record it among the good dividend paying mines of the county.

Butte.

MAGALIA RIDGE.—Cor. Oroville Register, March 20: Prospecting and mining are as lively as ever. The Black Channel is driving ahead with good prospects. The Calumet has had a slide that stopped work for a week past. The Johnnie Bare and Parks mine is taking out a good share of the precious metal. Operations will soon begin on the Smith mine at Toad town, and you may soon expect to hear of a strike there as the channel will be easy to tap with the proper machinery.

Contra Costa.

STEWARTVILLE.—Concord Sun, March 20: Only a short time ago it was rumored that Stewartville would share the same fate as Nortonville, and that the mines would close down forever. Many besides the miners of Nortonville suffered from the loss at the closing of the Black Diamond mine. But from present indications Stewartville may live and bloom for generations, although it is regretted that Belshaw & Co. do not possess better mines; yet these enterprising gentlemen, despite such obstacles as water, breaks and fire still push ahead. The mines are working most every day, and the sales of coal improving.

Calaveras.

AT WORK.—Mt. Echo, March 18: Work is progressing with considerable vim at the Baumhoger mine near Altaville. The ore is crushed in an arastra which receives its motive power from an over-shot water-wheel 24 feet in diameter. The character of the rock is very good, and we expect to hear of a good cleanup shortly. Adjoining the above-named property is the Maltman mine, where operations are being pushed vigorously. The rock now being mined is of a very good grade. The ore of this mine is also crushed in an arastra operated by a 24-foot water-wheel. At the Matson mine in this place work is going steadily on. The mill is kept in operation day and night. This mine adjoins the celebrated Gold Cliff mine, and is on its southern extension. The Lane mine in this place is running in full blast. First-class ore is being taken out and the batteries are kept in motion continually. This mine is a valuable, paying property and is operated on an extensive scale. At the Toser mine in this place everything is booming. The mine is running full handed and a superior quality of ore is being extracted. The mill has been temporarily closed down, awaiting the arrival of new dies for the batteries. At the Stickle mine in this place work is progressing rapidly. The hoisting works and mill are kept in active motion day and night. We are informed that the quality of the ore now being stoped is remarkably good. The rock now being milled is taken from the 200-foot level. Numerous minor ledges are being prospected in this vicinity at present, some of them making an excellent showing. Without a doubt quartz mining will be booming in this section as soon as spring opens and the weather gets fairly settled.

MURPHY'S.—Cor. Calaveras Citizen, Mar. 20: A blast in the Oro Plata mine on the 10th inst. disclosed some fine ore. The future of this company bids fair to rival any company for good results anywhere in the county. The ore is of exceeding good quality and Supt. Morse is sanguine of ultimate success. Cunliff and Driver's mine on Indian creek is being worked with good results. A report of the mine is to be made for parties interested in the mine in San Francisco. This is one of the most promising mines in this vicinity. The placer mine of McCormick, Bisbee and Thomas, on Central Hill is now in full blast and good returns are expected. There can be no question but that the enterprise will prove a most profitable one.

El Dorado.

POCKET MINE.—El Dorado Republican, Mar. 20: George Kimble has bonded the old Hodge Pocket mine at Poverty Point from Seneca Davis and George Barlow, and is preparing timbers to use in the tunnel. The mine has not been worked for a number of years, and the tunnel has caved in a number of places. Some good pockets have been struck in this mine, and we hope George may find another as good as the best.

Inyo.

DEER SPRINGS.—Inyo Reporter, March 18: Mr. W. A. Greenly, of the Greenly Mill, Cottonwood creek, across the Inyos, dropped in for a little while the other day. The mill will not be started up for some weeks yet. The prospects of the camp generally are brighter than they have been before for many a day. Sam. Piper and A. A. Riddle continue taking out ore from a mine they have been operating on since last summer. Some of this ore is exceedingly rich, but only some five or six tons of the poorer grade from this mine has so far been milled and this yielded \$35 per ton gold. O. K. Berry is running a tunnel to cut a body of ore at the bottom of a shaft he sunk a number of years ago, from which he then took several tons of ore that milled about \$300 a ton in silver. This ore was worked at Belleville. The mine is called the Chloride. Broder & Co. are working on one of the largest gold mines out there, called the Golden Rule, and are getting out splendid ore and a good deal of it.

COMMENCED.—The work of rebuilding the old Sacramento mill at its new site on Coldwater some six miles from Bishop Station was begun in earnest this week. Mr. J. L. Bray is the boss mechanic, and his reputation as such is a guarantee of good work. The mill is to be run by a hurdy-gurdy

wheel, and is designed to work ores from the Casey mine, from which it is about three miles distant.

ORE AT DARWIN.—Inyo Independent, March 18: Frank Silva is getting ore out at Darwin that will pay well. Parties who visited the mine very recently say he has a large body of ore in sight. About two carloads are reported to be on the dump that will be shipped to San Francisco in a few days.

Monterey.

THE NEW MINES.—Salinas Index, March 18: Very little is being said of the Melville Mining Company at present, no shipments of ore or bullion having yet been made. It has leaked out, however, that one of the members of said company retorted a 15-ounce piece of the ore and got from it five bits in silver, or at the rate of over \$1200 per ton. Two more of our business men have been stricken with the fever and located claims in Melville district, fitting out a mining camp with tools and provisions and set their men to work. The Bull's Head M. Co. have commenced operations on their claims, and outsiders are anxiously awaiting the result.

Nevada.

BADGER HILL MINE.—Grass Valley Union, Mar. 20: The Badger Hill mining company having purchased the hoisting gear at the Washington company, bids will be received until to-morrow evening for its removal to the Badger mine, and its putting in place, beside the necessary grading, building, and the general erection of the plant for the hoisting works. All the plans and specifications have been drawn, and are to be seen at Johnston's hardware store. The works are to be run by water, the pumping and hoisting being done by a Pelton wheel, 12 feet in diameter, which is now being constructed by Mr. Pelton himself. The erection of the works is now to be pushed as fast as the weather will permit, and it is hoped to start up the underground work in the mine before many weeks pass away.

Placer.

AN IMPORTANT DEVELOPMENT.—Placer Herald, March 20: On the 10th inst. the prospect tunnel in the Dardanelles mine at Forest Hill, owned by Gen. Jos. Hamilton, broke through the bed rock into the channel and struck what is regarded as a very flattering prospect. This is good news for Gen. Hamilton, and a very important development for Forest Hill and the county. It furnishes additional proof of the great extent of the paying drift ground in that region and adds one more to the opened mines of the district. It tends also to further establish the claim made by experienced miners, that the Forest Hill Divide is destined in the near future to become the richest and most extensive drift mining district of the State.

NEW SHAFT.—Placer Argus, March 20: A new 200-foot shaft was begun at the Chicago mine near Penryn two weeks ago. It will take three or four months to complete it. Two shifts of men, 14 all told, are employed in the mine at present. A new wire rope for hoisting purposes has been ordered and as soon as that is in use a third shift will be put to work. H. J. Bevans is the superintendent.

GRIZZLY FLAT.—Placerville Observer, Mar. 18: The mining outlook of this district is decidedly promising. The Melton mining company have closed their mill for the time being, and Superintendent McClellan is vigorously driving the main tunnel so as to dump ore directly from the mine into the mill thus saving the expense of hoisting to the surface and handling twice. The Mount Pleasant is running regularly as usual. Capt. Smith has resigned the superintendency to a successor, but work is being vigorously prosecuted under the new management. Superintendent Alexander with his usual persistence and energy is pushing ahead the main tunnel at the Crystal mine. Under the management of Mr. Russel some new and valuable developments have been made at the Independence. Mr. Russel is confident that he will show up this old mine equal to its former palmy days in '67-8-9. Messrs. Smith & Hare of Cleveland, Ohio, have taken hold of the Chicago & Ohio Consolidated mine, and are preparing to construct reduction works on that valuable property, so long idle for want of capital. Mr. Hare has been for many years working to perfect a process for the desulphurizing of ores, which he claims to have succeeded in doing to his entire satisfaction, and assures your correspondent that he can work ores up to within five per cent of their assay value, at an expense not to exceed \$2.50 per ton. If this be true, it will work a revolution of inestimable value to the mining interests of the county, and give Mr. Hare the wealth he deserves for his years of toil in bringing forth this valuable invention. Mining men are looking forward with much interest to the day when Messrs. Smith & Hare get this process, with the necessary machinery, in operation on the Chicago and Ohio Consolidated. There have been many claims in this district and south on this belt held, some of them for twelve years, by simply posting notices, without doing a stroke of work. On the first day of the present year outsiders were up very early, the result being that many of these claims are now being developed and promise well.

THE IRON MINE AT HOTALING.—Placer Republican, Mar. 20: An accident occurred at the Hotaling iron furnace last Friday on account of which the fires had to be banked and work suspended. The road that connects the dumping lever with the bell in the top of the furnace broke and the bell, a large conical shaped piece of iron, dropped down into the furnace. It was destroyed as a matter of course. A new one is being made in San Francisco which will probably not be ready for use until next Monday. All work in the mine was stopped. There are at present about 2,000 tons of ore mined and when that is smelted there is no doubt that the surface will be shut down for good. It will not be in blast more than six weeks longer.

San Bernardino.

COAL.—San Jacinto Register, March 18: Messrs. P. L. Griffin, C. C. Bailey and McCormick & Weber have bonded the Arbuckle coal mine, located about 20 miles south of Riverside, in the Temescal range of mountains. This mine was only recently discovered and is proving to be a fine one, as a two-foot vein of coal has thus far been developed, while the work is only in its infancy.

MEN ENOUGH.—Calico Print, March 20: The King mine stood another draft of fifteen or twenty

men during the week. Outsiders will please note the fact that there are at present more than enough men in Calico, and act accordingly.

Sierra.

GOOD HOPE.—Sierra Tribune, March 20: At the Good Hope mine near Downville a tunnel is being run to tap the vein below the old workings. There is quite a long distance yet to run to reach the desired point, but the company hopes to get into the ledge this summer. San Francisco parties are furnishing the means to work with. H. H. Purdy manages the operation.

Shasta.

AMALGAM.—Republican Free Press, Mar. 20: Tom Green of Deadwood brought down this week \$2200 in amalgam. He has ordered a five-stamp mill which will be here in a few days. He took home a rock-breaker and other machinery Wednesday. Ollie Whitton has sold his interest in the Croesus mine on Squaw creek to Billy Edwards of Red Bluff for \$4500. Seven tons of rock from Major & Frick's mine at Lower Springs crushed in Andy Fife's mill averaged \$50 a ton.

Trinity.

REPORTED RICH DISCOVERY.—Humboldt Standard, March 18: Anton Silver, an old acquaintance, is down from New River. He reports a rich discovery on Slide creek and in which Capt. H. S. Soule is interested. He received the information from an old-timer in that region known as "Chicken," and believes it to be authentic. The report is that as the result of two pans of dirt washed the sum of \$30 was obtained. That sounds fabulous, yet it may be entirely true. The find was made in the immediate neighborhood of a claim in which Billy Levasseur is interested, and the latter gentleman naturally feels pretty good over the announcement. There are some of the New River locators of the last two or three years who are as firm as ever in their faith in the wealth of that region. Among them are Dean, Levasseur and Soule. And they intend to adhere to the present belief until the New River mines have been more thoroughly tested.

DEVELOPMENT CO.—Eureka Times-Telephone, March 18: The New River Development Co. are not doing anything in the mining district at present. They have leased several of their claims and are allowing the parties to develop the same. A short time ago Frank Zane leased the Oscar and Bear Cave and is working them. The company has already expended in New River several thousands of dollars, and still have great faith that all will turn out right. No definite plan of action has been decided by them as to just what would be done this spring, but the idea is to take one or more of the claims and prospect and open it up and ascertain what there is in it. Tunnels have already been run in the Selina and North Star, and Soule is now working the Oro Fino with good results, so it is stated.

Tulare.

A VALUABLE FIND.—Visalia Times, March 20: John Holmquest, who has been running the lime kiln in Frazier valley for the last five years, has discovered a mine which promises far to surpass anything of the kind ever before known in Tulare county. About five weeks ago he struck a gold-bearing quartz vein on the divide between Frazier and Pleasant valleys, about 30 miles southeast of Visalia. He has already sunk a shaft 27 feet in depth. The vein is three feet wide and of a slate formation, with well-finished walls of slate on each side. There is also a tale between the slate and the lead, which is considered by mining experts as a good indication. The lead runs southeast and northwest. The ore is easily removed, as it is broken and decomposed. Mr. Holmquest has made one or two blasts, but he claims that blasting is not necessary. Some time ago he sent samples of the ore to Adolph Mack, in San Francisco, to be assayed for gold. The returns showed \$42 to the ton in gold alone. The rock also contains considerable silver, but thus far it has not been assayed for that metal, although experts who have examined it say that it will assay well in silver. It will be assayed for silver soon. Mr. Holmquest owns 80 acres of land at the place mentioned, which he took up five years ago. Last fall he picked up some flat rock in the lime kiln that assayed 21 ounces in silver and \$12.60 in gold. This find caused him to believe that the precious metals existed in that locality. The ore does not show free gold, but he obtained particles of it from some of the rock which he broke in a mortar. Several extensions along his claim have already been taken by other people.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, March 20: Work is suspended at the bottom of the deep winze and station on the 3200 level, and will so remain until the Combination shaft is sunk deeper, so as to form a working connection. The proposition at present is to thoroughly explore the very promising ore developments between the 3200 and 2900 levels. This is being actively and effectively done. The good body of vein ore found in upraising above the 3200 level has shown considerable improvement during the week. The upraise is over 40 feet, following the inclination of the vein, and it has been stoped out to the extent of three or four square sets of timbers, showing a width of at least 20 feet, and how much more is not ascertained. The ore is of a fine free-milling character, carrying an unusually large percentage of gold, and giving high assays. The whole of it will pay well under the stamps. By some this is thought to be a different vein from that being followed above it, upward from the 3000 level, but a very competent and experienced bonanza expert, who recently examined it, is of the opinion that it is simply a good kidney or concentration of ore belonging to the same vein. This, however, will be ascertained in due time. The upraise in the vein above the 3000 level is progressing well, and a few feet further will carry it through to its proposed connection with the 2900 level. Explorations with the diamond drill from the face of the main north lateral drift on the 3200 level, toward the Savage, are discontinued, and the drift itself will shortly be advanced in that direction.

OPHIR.—On the 300 level a lateral drift south has

been started from the main west drift to explore a promising section of the vein in that direction. On the 400 the drift north from the main west drift is in 321 feet. The west drifts on both these levels run from the old Mexican shaft and cross-cut the vein. These drifts, as well as the lateral drifts north and south from them, have thus far developed only low-grade ore, yet as very rich bunches and streaks of ore were extracted from the surface and as low as the 250 level at this point in former days, it is fair to presume that more of the same sort may be found in the present deeper explorations. On the 200 level the joint Mexican and Union drift running northwest from the Ophir shaft through the Ophir ground is now in 506 feet and is running in Mexican ground. Material, vein porphyry, with streaks and bunches of quartz.

CON. CALIFORNIA AND VIRGINIA.—The mine is in full work again, as before the breakage at the Eureka mill, giving a daily output of over 400 tons of ore. The grade does not run high—about \$12 per ton on the average. The south-west drift on the 1400 level is in 395 feet, and explorations are going ahead in the old bonanza stopes reopened by the north-west drift on the 1650 level.

POTOSI.—On the 3200 level the main lateral drift south from the Chollar is in 83 feet beyond the line, and making excellent progress in dry ground, following the west side or footwall of the vein. Unless interrupted by some adverse circumstance Superintendent Hamilton will have this drift run through to the Fullion line in a shorter space of time than is generally expected.

CHOLLAR.—No crosscutting as yet on the 3200 level and no orders received to resume sinking the Combination shaft. In fact sinking this shaft deeper at present would interfere with the exploration of the 3200 level, including the advancement into the Potosi ground which is being conducted through the Chollar.

SIERRA NEVADA.—The crosscut east on the 520 level, some 1,800 feet north of the shaft, was advanced 54 feet during the week, making a total length of 230 feet. Material in face, vein porphyry and clay, with a little water, indicating something more favorable in that direction.

GOULD AND CURRY.—On the 600 level the work of reopening and repairing the main drift to the southwest is making excellent progress, 60 feet having been advanced during the week. This drift is supposed to reopen a body of good ore known of toward the Savage line.

YELLOW JACKET.—Daily yield about 130 tons from above the 1300 level, keeping the Brunswick mill supplied. Explorations are still being continued on the 1700 level, with a view to developing an expected ore body at the northern portion of the mine.

MEXICAN.—On the 500 level east crosscut No. 2 is in 240 feet. No change in material. A crosscut west from the main north lateral drift has been started which is now in about 40 feet. Material, vein porphyry, with streaks of quartz.

BEST AND BELCHER.—The pumps are merely holding the water at the 228 level of the shaft, draining the openings and ground at that point before proceeding any deeper. The pumps are working smoothly and well.

CROWN POINT AND BELCHER.—The old upper workings continue their regular yield of low grade ore, with a good contribution of higher grade from the 1700 and 1600 levels, the daily output being about 360 tons.

KENTUCK.—About 45 tons per day continues to be the yield of the mine, supplying the Rock Point mill exclusively. This ore comes from above the 1300 level, and is of pretty low grade.

ALTA.—The main lateral drift north on the 700 level is still running in dry vein porphyry and has reached within about 60 feet of the Benton ground.

JUSTICE.—On the 350 level at the southern portion, a considerable amount of low grade ore is being developed.

UNION CON.—North lateral drift No. 2, on the 500 level is in 256 feet. Material in face vein porphyry.

Bell District.

AT WORK.—Belmont Courier, Mar. 19: Work is still being steadily pushed in the mines of Bell district.

Esmeralda District.

THE ENGLISH COMPANY.—Aurora Star, Mar. 16: The Consolidated Esmeralda Mining Company (Limited), of London, England, having purchased a number of properties in Esmeralda mining district including more than forty claims, hoisting works and a twenty-stamp quartz mill is attending to its own business. Considering the season of the year and the difficulties to be encountered in getting lumber and other material, the company have done considerable work toward developing some of their mines, besides putting up hoisting works on the Humboldt Consolidated, or the Blasdel series, where the main shaft is nearing the 200 level as fast as three eight-hour shifts of men can sink it. Work has been going on in the Middle Hill tunnel, or Coulter group of mines and the tunnel is still going ahead. Considerable work has been done on the Del Monte claims on Last Chance Hill and more is contemplated. In short, this company have purchased a number of properties, either of which would have been considered good in former years. The Esmeralda, a patented claim on Silver Hill, the Durand and Live Yankee (patented), of the Middle Hill group, the Wide West, Last Chance, Spur and Real Del Monte, on Last Chance Hill, and the Juniata (patented), of Martinez hill, and the Del Monte hoisting works and shaft; the new Esmeralda group of twelve locations; the Humboldt and the Humboldt West (a patented claim), together with its twenty-stamp mill, constitute with some other claims, an aggregate properties hard to equal.

Garfield and Lapanta Districts.

THE FARRINGTON MINES.—Aurora Star, Mar. 16: The Farrington gold and silver mines of Esmeralda county have been incorporated. These mines after a great deal of labor and patience, have been placed by the promoters before the London mining public who are ever ready to invest in good dividend mining and milling property, whether situated in Nevada or elsewhere. The prospectus of the Farrington mines (limited—gold and silver) has been issued in London. The properties consist of

nine mines in this county, eight of which are silver and "situated in Garfield mining district; the other is the celebrated Lapanta gold mine in the Lapanta mining district, all of which are of great value and in the county of Esmeralda, on the line of the Carson and Colorado railroad. Four of the mines are developed and opened out by tunnels and shafts, and supplied with a five-stamp mill, engine and the usual accessories.

Globe District.

SILVER.—Belmont *Courier*, Mar. 19: Purley Plane has taken the contract to sink the shaft 100 feet on the newly bonded prospect in Globe district.

Ione District.

WORK PROGRESSING.—Belmont *Courier*, Mar. 19: Work is progressing steadily in the Indianapolis mine, near Ione with constantly improving indications. We hope that an extensive ore body will soon be uncovered.

Jackson District.

NEW MILL.—*Silver State*, March 20: Ferd. Ried returned yesterday from a trip to Jackson District. He says the new mill has started up, and is running steadily on ore from the Pennsylvania mine. The ore is crushed by stamps and then concentrated, from fifteen to twenty tons being reduced every twenty-four hours.

Jungo District.

PROSPECTING.—*Silver State*, March 20: Charley Bernard and William Merrill, of Jungo District, are in town. There are nine men prospecting and mining in the camp. Bernard has leased the Atlantic table and lottery mines, now consolidated, and is taking out rich ore, which he finds in paying quantities. It is thought it is a good chloriding camp, as the ores will pay to ship.

Jefferson District.

ORE.—Belmont *Courier*, Mar. 19: The chloriders of Jefferson continue to take out some very good ore.

Northumberland District.

CHLORIDERS. Belmont *Courier*, Mar. 19: The Northumberland chloriders continue to take out good ore.

Peavine District.

TAKING ORE.—Belmont *Courier*, Mar. 19: James Fraser continues to take ore out of his mine near Peavine.

Pioche District.

FINE ORE.—Pioche *Record*, Mar. 13: The two young men chloriding out in the Bullionville mine, located about three miles west from town, are extracting some very fine ore. This is the mine discovered by John H. Ely in 1875, after returning broke, from his gay life in Paris. The mine is owned by Dick Rich, John H. Ely and Lawson Atchison, and is said by the many to require only little development to make it valuable property. It was the first and only mine in Ely district in which a patent had been applied, until within about a month, when C. H. Patchen made application for patent to the Gold Ledge ground.

Pennsylvania District.

MILL.—Pioche *Record*, Mar. 13: The mill in Pennsylvania district will start up the first of the coming week. If the wire screen had been on hand it would have started the first of the past week.

San Antonio District.

CHLORIDING.—Belmont *Courier*, Mar. 19: It is whispered that considerable chloriding will be done in the San Antonio mine, as soon as the snow goes off.

Tuscarora District.

NORTH BELLE ISLE.—*Times Review*, March 20: Work has been entirely suspended, pending litigation.

BELLE ISLE.—North drift from east crosscut No. 1, 450-foot level, has been extended 13 feet. Belle Isle and Navajo joint crosscut, 150-foot level, has been extended 20 feet.

GRAND PRIZE.—South drift on the 200 level extended 28 feet, and the north drift, same level, 15 feet. Stopes are producing considerable good ore at present. Mill is running all right, but will close down in a few days, temporarily.

NAVAJO.—No. 1 upraise, east lateral, 350-foot level, has been carried up six feet. No. 2 upraise, east vein, same level, has been carried up six feet. Crosscut No. 2, 250-foot level, has been extended four feet; the rock still remains hard. South drift from the same crosscut has been extended 13 feet.

Washington District.

NO BOOM.—Belmont *Courier*, Mar. 19: The mining boom has not struck Washington district yet. Uncle Billy Koch continues to work his mine in San Juan canyon.

ARIZONA.

COPPER.—Arizona *Silver Belt*, March 20: That Globe will shortly become the acknowledged copper producing district of the southwest is becoming more and more apparent to those who have given the matter their attention. In addition to the already well known deposits or veins of copper in this district, we have to add the recent satisfactory developments in the Ogden and Crown Point mines, hitherto but little known. The croppings are strong, bold and well defined and plainly in view for 2,000 feet, and give hopeful indications of large ore bodies being revealed as the vein is sunk upon. The ore is carbonate and as tested in the Old Globe furnaces, is easily reduced. It carries its own flux and is of exceeding richness.

NOTES.—Prescott *Courier*, March 18: We hear that Mr. Moody has sold an interest in the Ready Pay mine to Chicago parties. Hon. Sumner Howard and co-owners of Lawler Bros.' great Santa Maria mines will shortly have them patented. Col. H. A. Bigelow, David Grubb and other miners of Hassayampa district, will commence shipping ore as soon as snow gets a little thinner. Groom Creek mines are yielding pretty rich ore.

The Dougherty mine, in Martinez district, is well liked by those who have examined it. Turkey creek miners are preparing to ship rich silver ore. It is

rumored that the Gray Eagle and Cougar mines, in Bradshaw district are wanted by moneyed men. We heard yesterday that Wells H. Bates, Professor Blake and other gentlemen are in Weaver district looking after lode properties. The hydraulic and placer miners continue to send in gold, and we believe they are all doing well.

SALERO.—Ineson *Citizen*, March 16: Tom Durand, who is now in the city from Salero, reports some very important strikes in that camp. In the Lucifer mine owned by the Santa Rita M. and M. company formerly the Salero company, a fine body of ore has been encountered, much of which assays 4,000 ounces per ton, in silver, and the pay streak gives an average assay of over 1000 ounces. Six tons of this rich ore are now on the dump, and more is being taken out, with a prospect of the rich body holding out. The Wide West also belonging to the company, is showing some very fine ore, and the ledge is improving with depth. Changes are being made in the mill and the leaching process will be used. The Olmstead mine adjoining the Lucifer, owned by Mrs. L. E. Durand, has also developed a fine body of ore assaying across the ledge 1500 ounces to the ton. Harry Holland has recently made a fine strike on one of his claims. At a depth of from 12 to 15 feet he has a three foot ledge of solid ore that gives an average assay of 130 ounces and from 40 to 60 per cent lead. It is a fine prospect. He is taking out lots of ore and will ship it to Deming for the Pueblo smelter. The whole camp is bristling with activity and encouragement, and a good future is looked for in that favored locality.

COLORADO.

GOLD AND SILVER.—Biggs & Co., lessees on the Anglo-Saxon extension west, are drifting and raising on a vein of decomposed mineral about four inches in thickness. The Coulter lode is being worked under lease through the Bullhead tunnel by Finley, Thompson and Walters, who have opened up two feet of quartz sprinkled with gray copper. The lessees on the Muscovite lode, Democrat mountain, have a vein of solid galena which mills 14 ozs. silver and 61 per cent lead. The Bush lode, on Sherman mountain, shows a vein of solid ore in the bottom of the 110-foot shaft two inches in thickness which mills from 35 to 50 ozs. silver and about 50 per cent lead. Forty-seven cars of ore were shipped from Georgetown last month, the total weight of which was 1,160,210 pounds. We are informed that a good strike has been made in the Backbone, mineral from the new streak returning as high as 600 ozs. silver to the ton, besides a good per cent in lead. Gustafson & Co., lessees on the Duncan lode, Brown mt., are working upon an excellent streak of mineral, and are extracting large quantities of ore. They made a shipment of about 4500 pounds this week, which returned, according to class 260 and 229 ozs. silver per ton, and about 23 per cent in lead. Quantities of high grade ore are being produced by the lodes in the Claypool tunnel. Millruns this week have testified to that fact. A good body of high grade ore is said to have been opened up in the Baltic lode, on Silver creek. One party of lessees on the Stevens lode, Argentine, have about 90 tons of ore ready for shipment. A party of Italians took a lease on the tunnel level last week, and are stopping on a 12-inch vein of mineral. About 45 men are prosecuting work in the Baltimore mine. Drifting is in progress upon levels numbers 4, 5, 6, 7, and 8, and a number of good ore bodies are opened. The Mauch Chunk lode, on Beaver creek, which has lain idle so long, is now being worked by the owners Hannigan & Co. The drift upon the lode is being pushed ahead with good indications. The Cory City mine is working fifty men, who are rapidly opening up new ground. Work is being pushed in every direction, and although most of it is on development, yet the mine is producing on an average of \$10,000 per month.

IDAHO.

MINING DITCH.—Idaho *World*, March 18: The McLean Mining Company of Eagle Rock has just made a contract with W. H. Homer, formerly sheriff of Oneida county, for the construction of a large mining ditch to be 16 feet wide on the bottom and when completed will be about 25 miles long and will cost about \$25,000.

STRIKE IN THE MINNIE MOORE.—About midnight of last night, just after the 11 o'clock shift went on, they struck the richest body of ore ever cut into in the Minnie Moore. It was struck in a crosscut in the 600 level and at 5 o'clock this morning the men had gotten into it two feet. They have taken out one carload of the richest ore ever taken from the Minnie Moore, and up to noon of to-day the other wall had not been reached, so nobody knows how wide the ore body is. The news of this rich strike spread like fire soon after five o'clock. Men met on street corners and gave expression to their joy by cheers and hearty handshakes. It puts Broadford on the "lively" list as of yore, and it gives confidence to all classes along the river. There are to-day about 50 men at work on the Minnie, and since this "find" they will be increased, most probably, inside of 60 days, to 200. And as an equal number will be steadily on the Queen of the Hills which adjoins the Minnie and has vast quantities of ore exposed, it is safe to predict that in a very short time Broadford will boom as she never boomed before.

THE BULLION DIVIDE.—Wood River *Times*, March 17: William H. Atkinson, who has lease on the Red Cloud claim, at the head of Narrow Gauge gulch, is down after a prolonged stay on the Bullion divide. He reports the claims in that vicinity looking well, and showing more ore than ever before. In the Red Cloud's new workings there is a drift over 100 feet long, which shows ore all the way from the initial point to the face with more ahead. From this drift a raise has been driven 30 feet to the surface—which shows ore all the way. A winze is down 25 feet, all the way in ore. From the workings fully 300 tons of high-grade ore can be extracted whenever it is desired to do so. This work has all been done this winter. The old workings of this claim also show well in ore that goes 80 ounces silver and 75 per cent lead per ton. This claim is good for all of 600 tons of ore this summer. It is owned by the Porter Brothers and Mr. Mason, the Cyclops, which adjoins, shows ore all the way in the winze, which is down 50 or 60 feet below the tunnel level. A main working tunnel is being driven to tap this ore-body at a depth of about 100 feet from the surface. The ore referred to is of higher grade than

any yet extracted from this claim. Chris. Hendricks, who has a lease on the French Boys' group, is working four men, and extracting about two tons per day. He must have all of 30 tons of first class, and 50 to 60 tons of second class ore on the dump now, and will doubtless make a splendid clean-up in the spring.

MONTANA.

PHILIPSBURG.—Cor. *New Northwest*, March 19: Never before in the history of our camp has its future seemed more permanent or promising. This is largely attributable to the interest that mine owners themselves are taking in the development of properties heretofore unworked, save by yearly representation. Among the number of lode claims that development has proved to be valuable and worthy of extended notice is the Young America. This mine is opened by tunnel levels, carries about 24 inches of very high grade chloridizing ore, and exhibits all of the pleasing features of a true fissure vein. The fortunate owners, Messrs. Mackey, Bullard & Co., are to be congratulated in this successful ending of a long and arduous work. These gentlemen, with everything but strength, endurance and faith against them, drove tunnel No. 2 500 feet through a hard granite country to catch the vein on its dip. Their reward is great as well as deserving.

WEST GRANITE.—The header of No. 1 tunnel is being steadily driven east. The vein is wide and strong, the ore laying to the footwall. As depth is what is desired, the work is being pushed to that end; the vein filling between the ore and hanging wall, after removal, constituting the level proper. The footwall of the vein is not known, and, of course, the thickness of the quartz cannot be given. In breaking off pieces here and there, however, the rock looks well, and in texture and general appearance is precisely similar to that nearest the surface in the Bonanza ground, a few hundred feet further up the hill. This company is expending every dollar in systematic development, and there is a notable absence of poor work in the timbering of the level. Three shifts of men drive five feet ahead every 24 hours. The Granite is working ore from the upper stopes. The output this month will probably reach 150,000 ounces. Of course the mine looks well—it could not look otherwise under its present management. The Hope is running steadily in ore out of the new strike. I understand the quality is first-class and the supply adequate for the present year's run.

THE BURLINGTON.—The mines at Burlington have been brought to their present prosperous condition through the united efforts of poor miners. The Burlington mine is worked under lease by Messrs. Edwards, Job, Madder & Co., who have done an immense amount of work on the property. A new shaft has been sunk 120 feet, new and capable hoisting and pumping machinery has been put in place at great cost, and to-day the Burlington is one of the best little mines to be seen anywhere. The stopes in the 120-foot level are opening out nicely, the ledge is constantly increasing in value, and the lessees are correspondingly happy. There are nearly thirty men employed by the lessees.

THE ALICE.—*Free Press*, Mar. 20: During the past week the ledge recently discovered on the 800 foot level of the Alice has widened out to such an extent, and has increased in value so much, that the management have concluded to commence the work of carrying the shaft down to the 1000-foot level. This work will be commenced next Monday and it is confidently expected that in forty days the 1000-foot level will be reached. The 800-foot looks grand. The stopes on the 700 foot level and also on the other levels of the mine are producing the usual quantity of ore.

THE MAGNA CHARTA is looking unusually good and there is more ore in sight in the mine than ever before. The stopes on the 100, 200, 300, 400 and 500-foot levels are producing an immense quantity of good mineral while the ledge below the 500-foot level is as yet hardly touched.

THE ANACONDA.—This is a very remarkable mine. It is one vast treasure bed. The ledge in the 700-foot level is increasing in width and richness daily until to-day it is nearly seventy feet wide and carries a larger percentage of silver than ever before. On the 800-foot level the ledge is nearly one hundred feet wide, all of which is good paying ore.

THE MOULTON.—The stopes on both veins are producing the usual quantity of ore, and Supt. J. K. Clark is very sanguine concerning the future of the property. Another dividend of the property has been declared, and on Monday next the stockholders will have \$30,000 dividend among them.

THE LEXINGTON.—The main shaft of this mine is nearing the 1000-foot level. When that point is reached crosscutting for the ledge will be in order. The stopes on the upper levels of the mine are looking and producing well.

NEW MEXICO.

NOTES.—Hadley, Wallace and Radcliff are developing their valuable claims in Water canyon. The Socorro Tunnel Company will soon commence operations on their property, three miles west of this city. The ore output from the Comstock mines for the last three months of 1885 was 60,370 tons, valued at \$249,897.73. A bonanza mine has been struck one mile west of the lake, and three miles from Lake Valley. T. B. Fitch and Dennis Laughton, who were grub-staked by J. M. Webster of Hillsboro, made the strike. There is nothing official or authentic yet in regard to the prospecting process at Lake valley, though the result is looked forward to with interest. The local paper says that 100 tons a day are treated, worth from \$8 to \$15 per ton, at a cost of \$5 per ton, but this is based on no authority.

LAKE VALLEY.—Rio Grande *Republican*, March 16: Lake Valley was put in a fever heat last Monday by the report of a new discovery of what promises to become another bonanza. From John Russell we have gained the particulars. The location of the strike is one mile west of the lakes, three miles from Lake Valley. A short time ago T. B. Fitch and Dennis Laughton, who were grub-staked by J. M. Webster, of Hillsboro, went into the locality and began prospecting. They located an old abandoned claim and went to work with twenty-five feet of a shallow shaft that had been sunk in the quartzite during the excitement some years ago. After breaking through the iron capping they came upon horn and native silver. For ten days they

kept their discovery a secret, until they and Mr. Russell, at whose place they were stopping, could secure the surrounding property. The mineral is identical with that found in the Lake Valley bonanzas, and assays something over \$5000 per ton.

OREGON.

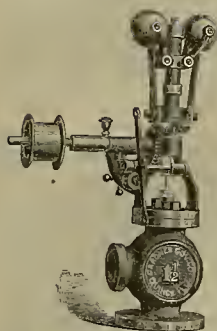
QUARTZ.—Jacksonville *Times*, March 19: Granville Sears and John Robinson have discovered a promising quartz ledge in the hills west of the latter's place. The County Clerk is kept busy recording locations of quartz mines, which shows that much prospecting is still being done. The quartz mill at this place continues to do good work and is run day and night. Work was commenced Wednesday on 30 tons of quartz belonging to McKenzie, Brown & Co. W. V. Jones, the Foots creek merchant, informs us that the miners of that district are doing well and that several fine pieces of gold have been picked up lately. The storms of the past week have been quite beneficial to the placer miners, whose water supply was generally beginning to fail. They will have the effect of prolonging the mining season considerably. Tim Dugan is now engaged in sinking a shaft on the silver-bearing ledge in Jackson creek district; he is interested in with Dr. Lemper and others. He has gone down 30 feet and the prospect is favorable. Brown & Co. have bought a half interest in Grob & Brandel's quartz ledge, paying \$10,000 for it; we learn; \$1000 will be paid down at once and the balance in 90 days. No doubt we will hear of more mining property being sold at good figures. Another promising quartz ledge was struck this week in the tunnel now being run by the Jacksonville Milling and Mining Co. Gold can plainly be seen in the ore. About 50 feet of the tunnel remains uncompleted, which will be finished in the next few weeks. The Jacksonville quartz mill finished 30 tons of ore from Grob & Brandel's mine on Jackson creek. A cleanup was made Wednesday which showed that the experiment was quite successful. As the amalgam had not been retorted as yet we are unable to give the result in dollars and cents. J. Garvin, of Wagner creek, was here this week, who informed us that E. Ray and himself had found a quartz ledge in the Gold Hill district which he thought the richest and most permanent yet discovered. Considerable gold has already been pounded out of specimens. The ore will soon be thoroughly tested at Brown & Co.'s mill in Jacksonville.

UTAH.

THE LEEDS' MINE.—Southern Utah *Times*, March 18: Kimple & Lewis, the lessees of the Leeds, while their work so far has been directed toward prospecting and opening up the mine, have several hundred tons of ore on the dump and broken in the workings, ready for hoisting. They have within the past five months, by the application of good judgment and hard work, developed a big mine out of property that was abandoned several years ago by a poor management, as worthless. Judging from the ore bodies in sight and the appearance of the ledges and formation, we can safely say that between forty-five and fifty tons of ore per day can be extracted for months to come. The ore body in the ledge, at a point about eighty feet below the old tunnel is fifteen feet in width and at another two hundred feet below this, twelve feet wide. The ore in these ledges assays from fifteen to thirty ounces per ton. A few weeks ago the feather edge of a vein of ore was discovered in the floor of an old stope, which on prospecting, opened up to eighteen inches of sixty ounce ore.

OTHER NOTES.—McCormick & Co., received \$2,690 worth of Stormont refined silver this week. The Stormont and Christy mines and mill are all working smoothly, with favorable results. Ed. Lockney, of the East Reef Bonanza, has temporarily suspended operations, discharged his shift boss, Mr. Smith, and gone to Frisco to become a wage worker. His property is a good one, the ore averaging forty ounces, but he cannot work it to profit until the mills meet miners half way, and reduce ore at a rate that will leave a reasonable margin or the mine owner. The situation must shape itself thus before the Reef can hope for prolonged prosperity, for it stands to reason that miners will not work for glory and go without grub.

REVIEW.—Salt Lake *Tribune*, March 19: For the week ending March 17th, inclusive, the receipts of bullion and ore in this city amounted to \$154,573.25, of which \$42,334.16 was ore and \$112,239.09 was bullion, thus keeping up the receipts of ore in this city, as compared with ore shipments abroad, at a high rate. The week previous the receipts were \$161,286.14, of which \$112,559.61 was bullion and \$48,726.53 was ore. The Ontario product for the week was 17,490 ounces. The product of the Daly for the week was \$7609.36 of ore. The Daly's Marsac mill is getting down to better work, the amalgamation now exceeding ninety per cent. Base bullion output for the week, \$18,000; fine bars, \$39,110. The Hanauer smelter turned out \$20,470 in bullion during the week; the Germania, seven cars, \$18,079.01; the Pascoe, \$1450. The Stormont sent up from Silver Reef, \$1520 in silver bars. The Horn Silver is producing some ore, but how much, or of what grade, it is impossible to learn. Ore receipts were \$9116; silver and lead ores \$15,190; Kent ore, Montana, \$728; Nevada ores, \$1280; lead and silver, \$16,020.16. The mining outlook about Stockton, Ophir and Dry Canon is growing brighter as spring approaches. The roads are so bad that but little ore is being sent out, but it is being extracted and piled on the dumps ready for shipping. The Hidden Treasure sent in eighty-seven tons of ore which was sampled at Foote's sampler in this city yesterday. It runs about \$90 per ton in silver. Frank Foote has got his machinery to work on the old Southport, which was abandoned twelve years ago by John Lawson. When he got the mine pumped out and the debris removed, he found ore along the shaft for fifty feet, of good grade and from eight to twenty inches in width. This property promises well, and it is believed many of the other claims long since abandoned in this district will yet become good properties. It is, however, no small undertaking to clean out these old mines and re-timber portions of them, as has been done with the Southworth, to make them secure. Mr. Tiernan is having his mine worked by lease, and the ore is being sent to the Pascoe smelter at Stockton. The lessees are talking of putting on a steam hoist, and have been negotiating for the machinery. The Kingston is also shipping ore to the Pascoe smelter.



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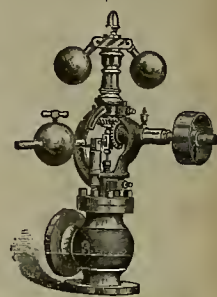
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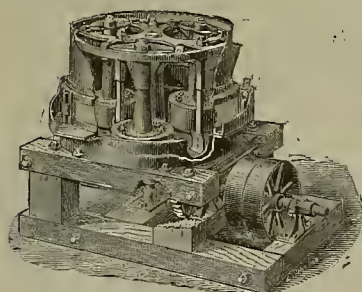
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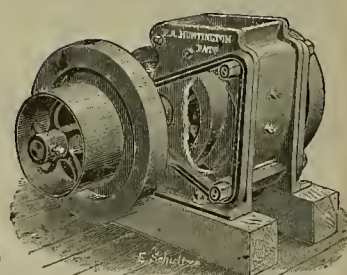
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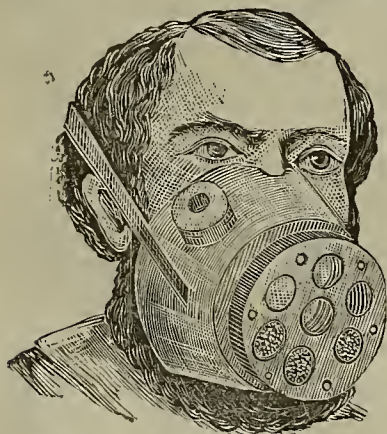


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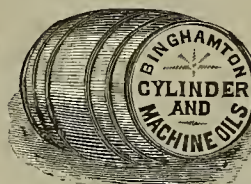
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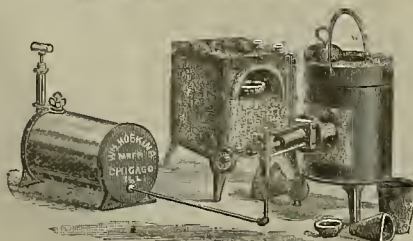
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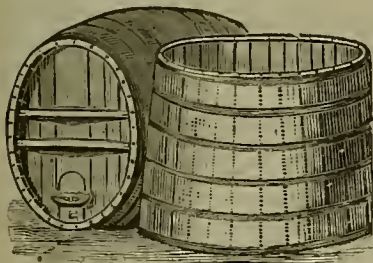
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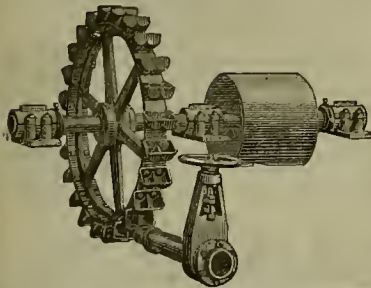
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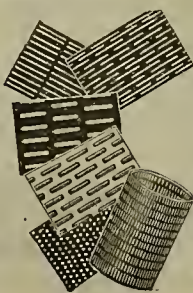
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Andes S M Co.	Nevada.	28.	25.	Feb 16.	Mar 23.	B. Burris.	309 Montgomery St
Benton Con M Co.	Nevada.	15.	10.	Feb 4.	Mar 11.	W. H. Watson.	302 Montgomery St
Buchanan M Co.	California.	15.	25.	Feb 9.	Mar 17.	T. J. Sullivan.	124 Post St
Con Pacific M Co.	California.	8.	15.	Feb 18.	Mar 22.	F. E. Luty.	330 Pine St
Crocker M Co.	Arizona.	2.	20.	Mar 10.	Apr 13.	A. Waterman.	309 Montgomery St
Forty-nine M Co.	California.	1.	10.	Feb 4.	Mar 15.	A. L. Perkins.	310 Pine St
Gover Improvement Co.	California.	1.	50.	Feb 8.	Mar 15.	E. N. Van Dine.	308 Montgomery St
Hale & Norcross M Co.	Nevada.	39.	50.	Feb 11.	Mar 11.	J. F. Lightner.	309 Montgomery St
Johnson N Co.	California.	3.	02.	Feb 3.	Mar 8.	G. W. White.	318 Montgomery St
Lady Washington Con M Co.	Nevada.	5.	05.	Feb 4.	Mar 9.	W. H. Watson.	302 Montgomery St
Martin White M Co.	Nevada.	21.	25.	Mar 16.	Apr 20.	J. J. Scoville.	309 Montgomery St
Mex can M Co.	Nevada.	31.	25.	Feb 9.	Mar 15.	C. E. Elliott.	309 Montgomery St
North Belle Isle M Co.	Nevada.	10.	20.	Mar 2.	Apr 6.	J. W. Pew.	340 Pine St
Potosi M Co.	Nevada.	22.	30.	Feb 4.	Mar 9.	C. E. Elliott.	309 Montgomery St
Peerless M Co.	Arizona.	7.	25.	Mar 3.	Apr 5.	A. Waterman.	339 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Anglo-Mexican M Co.	Mexico.	C. A. Moore.	419 California St.	Annual.	Apr 6
Ataska M Co.	California.	A. Judson.	320 Sansome St.	Annual.	Mar 31
Homeward Bound Plm M Co.	California.	D. A. Smith.	209 Post St.	Annual.	Apr 15
Mayflower Gravel M Co.	California.	J. Moritz.	328 Montgomery St.	Annual.	Apr 1
San Jose De Gracia M Co.	Mexico.	C. A. Moore.	217 Sansome St.	Annual.	Apr 3

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
California M Co.	Nevada.	W. L. Oliver.	323 Montgomery St.	10.	Feb 23
Con Virginia & Cal M Co.	Nevada.	A. W. Haven.	399 Montgomery St.	30.	Feb 12
Dredge Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Feb 9
Holmes M Co.	Nevada.	C. E. Elliott.	319 Montgomery St.	25.	Mar 20
Mono M Co.	California.	G. W. Sessions.	339 Montgomery St.	25.	Mar 10
Manhattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Feb 17
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar 15

List of U. S. Patents for Pacific Coast Inventors.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING MARCH 16, 1886.

- 337,919.—SPRAYING PUMP—John Bean, Los Gatos, Cal.
- 337,817.—MARINE GOVERNOR—Chas. Dickenson, Portland, Ogn.
- 337,941.—BRIDGE WALL SUPPORT—Jos. Enright, San Jose, Cal.
- 337,942.—EXERCISING MACHINE—B. Farley, S. F.
- 337,864.—HYDRAULIC MOTOR—G. S. Pidgeon, San Diego, Cal.
- 337,901.—PULVERIZING MILL—E. A. Wall, Bullion, I. T.
- 337,910.—WATER LEVEL INDICATOR—Jos. R. Wilcox, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Mining Share Market.

There does not appear to be any interest manifested in the stock market, notwithstanding the reported improvement in the ore development in the upraise above the 3000 level of the Hale & Norcross. The lateral drift south on the 3000 level through the Potosi ground is progressing finely, passing through a very interesting section. No orders are yet received to resume sinking the Combination shaft. This, however, is a movement not temporarily necessary, just at present, as the companies concerned desire to thoroughly explore the 3000 level continuous through them all, before going deeper. Meanwhile work at the 3200 level and station of the Hale & Norcross deep winze is therefore necessarily suspended, and will remain so until the shaft is sunk to that level. The Virginia Enterprise speaks as follows of the Hale & Norcross development. The ore vein being developed by upraising from the 3000 level of Hale & Norcross, is opening up splendidly, and showing a valuable ore body, which promises to develop into a genuine old-time bonanza. It is good-paying ore, giving bonanza assays, but its extent in any direction is not as yet ascertained, the present proposition being to follow it with the upraise to a connection with the 3000 level. It certainly is a very promising and encouraging prospect.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports: Alice, March 19, \$48,560; Moulton, 16, \$21,104; Lexington, 16, \$22,112; Silver Bow, 16, \$18,992; Germania, 16, \$5079; Hanauer, 16, \$3710; Germania, 17, \$5419; Hanauer, 17, \$5550; Alice, 17, \$12,727; Hanauer, 19, \$5400; Pascoe, 19, \$1350; Stomont, 20, \$2110; Hanauer, 20, \$2600. For week ending March 17, Wells, Fargo & Co. at Salt Lake shipped bullion valued at \$66,316; McCormick & Co., \$40,638; T. R. Jones & Co., \$34,099; and Union Bank, \$13,520; total, \$154,573.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco: HUBERT CONCENTRATOR Co., March 19.—Object to engage in the manufacture of the Hubert Dry Ore Concentrator, the Hubert Wet Ore Concentrator and other machines for the reduction and treatment of ores. Capital stock, \$1,000,000. Trustees, Hall McAllister, Wm. H. Rodda, Marc Levinston, Jos. Hubert and E. L. Campbell. CHICAGO MINING Co., March 19.—Location, Amador Co. Capital stock, \$2,000,000. Trustees, John Cuffs, Charles H. Eaton, J. M. Bryan, P. A. Doane and George W. Watson.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 4.	WEEK ENDING Mar. 11.	WEEK ENDING Mar. 18.	WEEK ENDING Mar. 25.
Alpha.	.35	.45	.15	.40
Alta.	.10	.15	.30	.35
Andes.	.10	.15	.10	.10
Argenta.	.10	.15	.10	.10
Belcher.	.90	1.05	1.05	1.15
Belling.	.10	.10	.10	.10
Best & Belcher.	1.25	1.70	1.30	1.70
Bullion.	.45	.50	.40	.45
Bonanza King.	.10	.10	.10	.10
Belle Isle.	.10	.10	.10	.10
Bodie Con.	1.55	1.75	1.50	1.75
Benton.	.10	.10	.10	.10
Bodie Tunnel.	.10	.10	.10	.10
Bulwer.	.60	.60	.60	.60
California.	2.25	2.40	2.10	2.40
Challenge.	.15	.20	.15	.20
Champion.	.10	.10	.10	.10
Chollar.	1.20	1.20	1.25	.95
Confidence.	1.10	1.40	1.15	1.25
Con. Imperial.	.25	2.40	2.10	2.40
Con. Virginia.	.20	.25	.20	.25
Con. Pacific.	.10	.15	.10	.15
Crown Point.	1.15	1.15	1.15	1.05
Day.	.10	.10	.10	.10
Eureka Con.	1.90	2.00	1.85	2.00
Eureka Tunnel.	.10	.10	.10	.10
Exchequer.	.10	.10	.10	.10
Grand Prize.	.10	.10	.10	.10
Gould & Curry.	1.00	1.15	.75	1.10
Goodshaw.	.10	.10	.10	.10
Hale & Norcross.	2.20	2.90	1.80	2.15
Holmes.	.10	.10	.10	.10
Independence.	.10	.10	.10	.10
Julia.	.10	.10	.10	.10
Justice.	.10	.10	.10	.10
Martin White.	.10	.10	.10	.10
Mono.	3.80	4.30	3.95	4.05
Mexican.	.40	.45	.35	.50
Mt. Diablo.	3.50	3.75	3.75	4.00
Northern Belle.	.10	.10	.10	.10
Navajo.	.10	.10	.10	.10
North Belle Isle.	.10	.10	.10	.10
Occidental.	.10	.10	.10	.10
Ophir.	.50	.60	.60	.95
Overman.	.35	.40	.25	.30
Potosi.	.30	.55	.40	.75
Pinal Con.	1.30	1.45	1.09	1.30
Savage.	1.30	1.45	1.09	1.30
Seg. Belcher.	.75	.85	.70	.80
Sierra Nevada.	.10	.15	.10	.15
Silver Bell.	.10	.15	.10	.15
Silver King.	.475	.65	.50	.65
Scorpion.	.10	.10	.10	.10
Syndicate.	.10	.10	.10	.10
Union Con.	.10	.10	.10	.10
Utah.	.70	.75	.70	.80
Yellow Jacket.	.95	1.05	.90	1.00

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Mar. 25.	250 Gould & Curry.....	80@85¢	
100 B. & Belcher.....	1.40	3.40 Hale & Nor.....	2.60@2.65
100 Bodie Con.....	1.25	230 Holmes.....	8.25@8.60
400 Bulwer.....	1.50	200 Jackson.....	6.00@6.50
50 Belcher.....	.10	200 Mt. Diablo.....	3.50
500 Benton.....	.06¢	100 Mt. Diab.....	.50
100 Chollar.....	.95	300 Ophir.....	.85¢
100 Confidence.....	1.25	150 Potosi.....	.55¢
20 Crown Point.....	.95¢	150 Savage.....	1.20
500 Con Va & Cal.....	2.25	150 Sierra Nevada.....	.60¢

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Mar. 25, 1886.		
ANTIMONY—Per pound.	—	@ —
Hallet's.	12	@ —
Cookson's.	13	@ —
BORAX—San Bernardino.	—	@ 8
Armazgos.	—	@ 61
IRON—Glenfarnock ton.	22 50	@ —
Edgilton, ton.	20 50	@ 21 5
American Soft, ton.	24 00	@ —
Oregon Pig.	—	@ —
Clippier Gap, Nos. 1 & 4.	22 00	@ 22 50
Clay Lane White.	24 00	@ —
Shotts, No. 1.	24 00	@ —
COPPER—		
Braziers' sizes.	17	@ —
Fire-box sheets.	20	@ —
Bolt.	17	@ —
Sheeting.	—	@ —
Ingot.	13	@ 14
LEAD—Pig.	4 75	@ 5 00
Bar.	4	@ —
Pipe.	7	@ —
Sheet.	8	@ —
Shot, discount 10% on 500 bag.	Drop, 1 bag.	1 85
Buck, 1 bag.	2 05	@ —
Chilled, do.	2 25	@ —
ZINC—German.	9	@ 10
Sheet, 7 1/2 ft. 7 to 10 lb. less the case.	—	@ 73
QUICKSILVER—By the flask.	—	@ 33 00
Flasks, new.	1 05	@ —
Flasks, old.	85	@ —
TINPLATE—Coke.	5 10	@ 5 40
Charcoal.	5 50	@ 6 00
NEW YORK PRICES—		
California Borax.	73	@ 74
Pig Iron, American.	42 1/2	@ 43 00
Quicksilver.	42 1/2	@ 43
Australian Tin.	20 60	@ 20 55
Bar silver.	1 02	@ —
Lead.	4 85	@ 4 95
Copper.	11 50	@ 11 62 1/2
Refined Silver (per cent discount).	20 1/2	@ 21 1/2

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DIVIDEND NOTICE.

OFFICE OF The Paradise Valley Mining Company.

San Francisco, California.

At a meeting of the Board of Directors of the above-named Company, held February 24th, Dividend No. 6, of Ten Cents (10c.) per share was declared, payable on SATURDAY, the 27th day of February, at the office of the Company. Transfer book will close on Thursday, February 25th, at 12 o'clock.

W. LETTIS OLIVER, Secretary. OFFICE—No. 328 Montgomery St., San Francisco, Cal.

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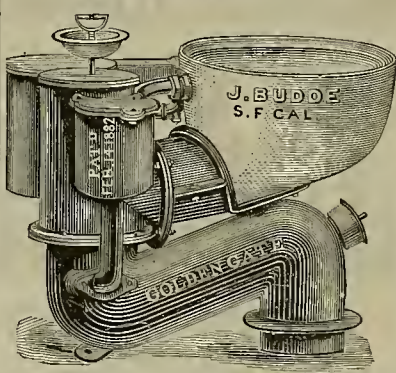
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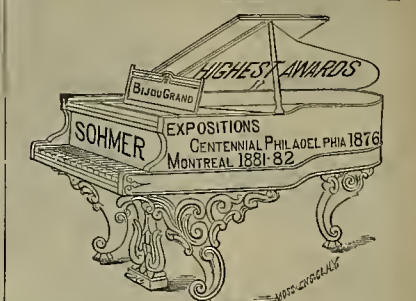
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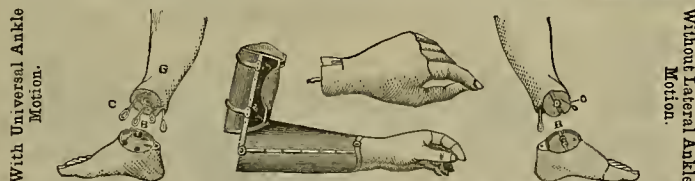
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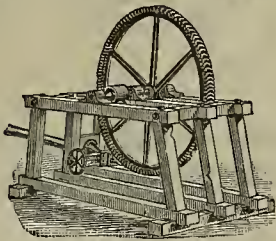
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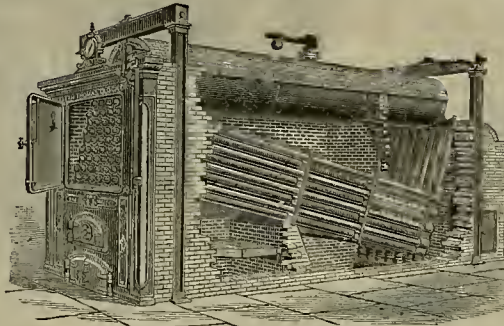
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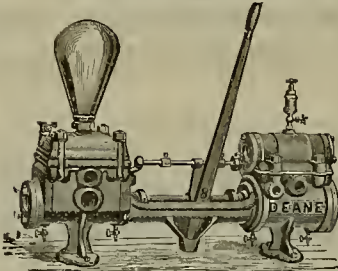
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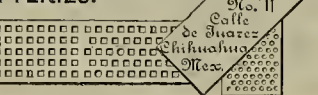
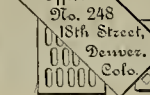
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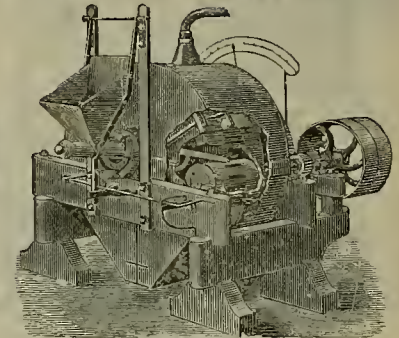
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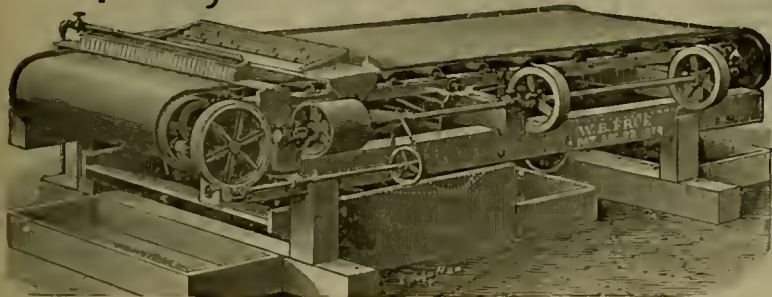
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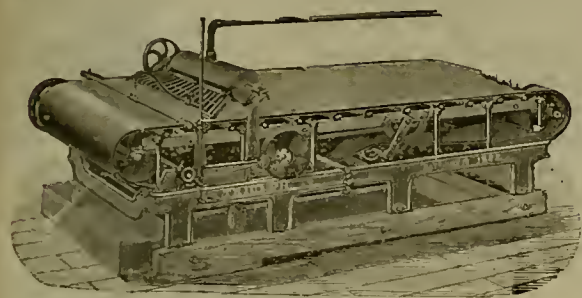
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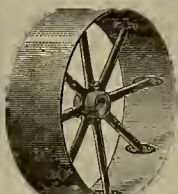
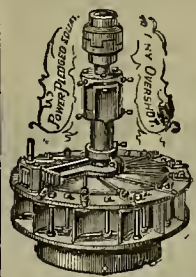
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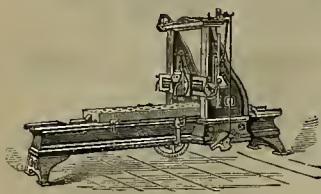
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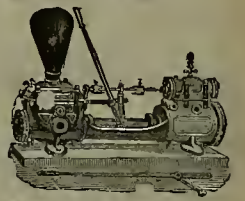
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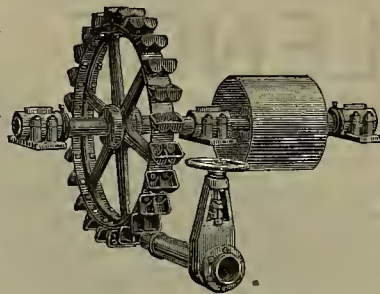
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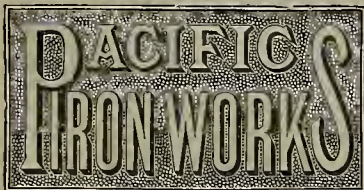
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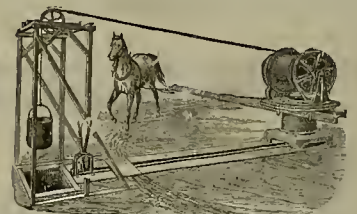
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THAN 150 of them are now RUNNING in various
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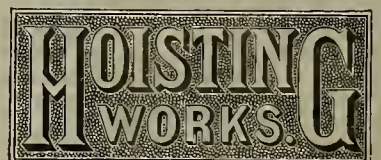
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500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, APRIL 3, 1886.

VOLUME LII
Number 14.

Steam Laundry Machinery for White Labor.

The exodus of the Chiacse, from the cities and towns of our commonwealth and sister States, which is being gradually accomplished by the silent, yet powerful workings of an inner law of our American social and political economy, has led, already, to the formation and organization of corporations and associations having, for their objects, the purposes of carrying on the business of laundrying, by the use of steam and the employment of white labor. Already at Healdsburg, Truckee and Eureka, in this State, and at Reno and Carson, in Nevada, entire plants for steam laundry purposes have been erected or are now in progress of erection, by means of the economy of which, and the employment of white labor only, the vexing problem of the Chinese question will be measurably solved, and a portion of the Mongolians be free to depart for their Celestial Kingdom.

In our issue of the 13th instant, we presented an illustration and description of a steam washing machine, manufactured and sold by Mr. J. B. Jardine, of this city; but as we incline to the opinion "that fair competition is the life of trade," and observe it as a true business principle, we take occasion to present in our present number, illustrations and descriptions of the improved steam washing machines and mangles, which are manufactured and sold by the Joshua Hendy Machine Works, of Nos. 39 to 51 Fremont street, this city.

These washers are an improvement on the styles yet introduced and an examination of the engraving will show the simplicity of their construction, the ease with which they can be handled in operation and the labor-saving principles and values which are evolved in and result from their use. These features are demonstrated by the fact that a No. 2 washer, 5 feet 6 inches in diameter, and 6 feet long, having a gear on both sides will perform all of the laundrying for a hotel or other public institution having say 500 guests or inmates, in one day in each week, or the equivalent of a hotel having 300 rooms.

These machines are provided, as shown, with automatic reversible motion, and hot and cold water and necessary steam pipes. They are now in use in the Stockton Insane Asylum, Napa Insane Asylum, City and County Alms House, San Francisco, Cal.; Salem Insane Asylum, in Eureka, Healdsburg, Santa Barbara, Reno, Honolulu, New Zealand, and all prominent laundries and hotels.

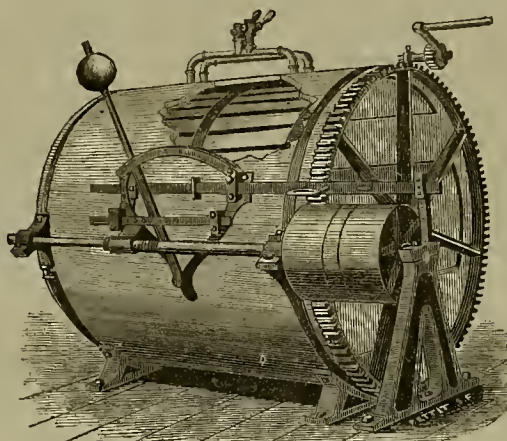
The horizontal, or box mangle, as is illustrated herewith, is the oldest existing substitute for the flat iron in the finishing or smoothing of bed and table linen, and its value is so well established that no laundry in hotel or institution is deemed complete without one. When run by steam power, it performs work as rapidly as a person can put the linen on the rolling pins and replace them under the box. The box is loaded with, say 800 pounds of stons, and this weight pressing on the linen while it is alternately tightened and loosened on the pins, and its surfaces rubbed together by the forward and backward movements of the box, imparts the soft and uniformly glossy finish, which is the box mangle's chief recommendation.

The foregoing named firm, "The Joshua Hendy Machine Works," are prepared to furnish complete and entire plants for thorough steam laundry work; embracing besides the

above, polishers, wringers, hot water and soap tanks and all the paraphernalia and outfit for drying rooms and closets and receiving and delivering offices; and they assure us that they will be pleased to furnish plans and specifications of all requisite laundry machinery and its general arrangement, and any information which may be requested to enable the managers of

The Alaska Mines.

In our "Mining Summary" is given this week some account of mines in Alaska, the means and cost of getting them, and the prospects. Quite recently new mines have been struck on the Yukon river and have caused quite a local excitement, men from the other camps leaving

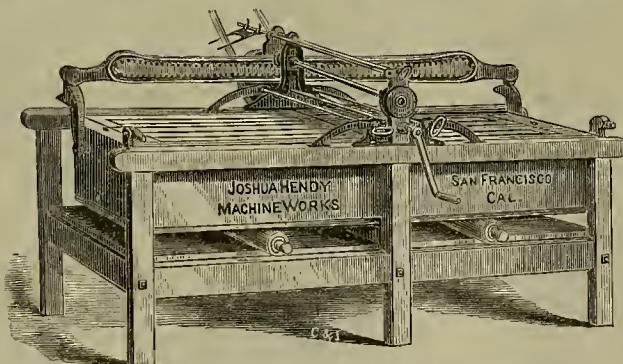


CHARTREY'S IMPROVED STEAM WASHING MACHINE.

such associations as are being organized to select such outfit as may be best adapted to their special conditions of use.

CONCENTRATION.—At the Mexican mill, on the Carson river, Nevada, a concentrator is about being brought into use in working the ores from the 1000 level of the Crown Point and Belcher mines. The ore from this point, ran

in numbers for the new placers. Several prospecting expeditions have been sent up the Yukon river in previous seasons and gold found in several places. Still, none of the ground has been found rich enough to pay the wages necessary to induce men to remain in the locality. The season is so short during which placer mining can be carried on, and there is so much enforced idleness by reason of the long winters,



THE HORIZONTAL, OR BOX MANGLE.

very high in free gold during the bonanza days, more so than anywhere else on the Comstock. The lower grades of this same rock have been worked since as long as they could be found to pay, but by concentration it is thought that they can be made to pay still farther and more extensively, so to speak, as there are millions of tons of it easily got at.

SMALL DAMAGES.—In the suit of the Champion Mining Company against the Wyoming Mining Company (Nevada county), for \$300,000 damages and a perpetual injunction against the defendant working ground claimed by the plaintiff, Judge Walling of the Superior Court has denied the injunction, and gave the plaintiff judgment for \$120 damages and costs of suit up to the time the answer was filed by the defendants. The costs since filing the answer were taxed against the plaintiff.

that a mine must be a very good one indeed to be profitable.

It is said now, however, that Hughes, the discoverer of the new camp, brought in 62 ounces of gold as the proceeds of 11 days' work. This was last fall, and as Hughes has again started, he has been followed by a dozen different parties who want to find the place. There is only one way to go, and that is by launch to Chilcat, via Juneau, the baggage being packed over the divide by Indians. The chain of lakes is then met and the prospectors can proceed on canoes all the way. In fact the only way to get about Alaska is by means of boats, there being rivers, streams and lakes in every direction.

A large part of the country is heavily timbered, and the surface is in many places boggy and marshy, and covered with moss. This kind of ground is practically impassable. The

dense timber also impedes progress; but with so many streams it is possible to go long distances quite easily.

Those who know anything about the country advise those who intend going there not to do so unless well procured with money. Suitable outfits must be procured, Indians hired, etc. A man should at least have \$150 after he arrives in Juneau if he expects to go to the Yukon or Stewart rivers. Miners' wages at Juneau are \$4 and \$5 per day in summer, but there are a good many men there now, and more are going. The big Treadwell mine, as it is called, with the 120-stamp mill, is on Douglas island, and is producing from \$50,000 to \$75,000 a month.

The Mechanics' Institute.

Active preparations are being made for the annual fair of the Mechanics' Institute in this city, and it is desired that it shall eclipse previous ones. In view of the fact that there are thousands of Eastern tourists expected here during the continuance of the fair, it behooves our citizens to assist the enterprise in every way. The following committees for the ensuing year have been announced:

Finance—Waterhouse, McDonald and Kerr; Library, Rooms and Building—Mahoney, Kerr and Jackson; Books and Donations—Bassett, Spaulding and Waterhouse; Lectures and Classes—Spiers, Mahoney and McDonald; Printing and Advertising—Spaulding, Stout and Hopps; Privileges—McDonald, Waterhouse and Stout; Rules, Regulations and Awards—Kerr, Wilcox and Spiers; Power and Machinery—Jackson, Spiers and Mallon; Tickets and Admissions—Stout, Kerr and Spaulding; Location and Police—Mallon, Jackson and Mahoney; Decorations and Art—Bower, Hopps and Mallon; Horticulture—Hopps, Bassett and Wilcox; Special Exhibits—Wilcox, Bassett and Jackson.

Messrs. Kerr, Wilcox, Spiers, McDonald and Hopps have been appointed a special committee to revise the premium list and arrange for this year's distribution of awards.

The following recently appointed honorary commissioners of exhibits for their respective districts have accepted the positions: Mark L. McDonald, Sonoma county; M. M. Estee, Napa; Thomas R. Bard, E. P. Foster and W. R. Blackstock, Ventura; J. J. Morrison, Placer; C. B. Kimball, Butts and Yuba.

The following additional appointments have been made: Mendocino county—L. F. Long of Hopland and A. O. Carpenter of Ukiah; Alameda county—Henry Curtner of Warm Springs; Solano county—L. W. Buck of Vacaville and A. T. Hatch of Suisun; Sacramento county—O. R. Ruayon, Courtland; San Diego county—Douglas Gunn; Yolo county—George D. Fisk, Woodland; Butts county—E. F. Fogg and B. F. Jones.

JUDGE SAWYER, of the U. S. Circuit Court, in the case of one of the persons taking part in the expulsion of Chinese from Nicolaus, holds that the Chinese are protected from "boycotting" or violence by the United States constitution. The decision is being widely commented on. The questions will now come before the United States Supreme Court.

The several mining companies at Klamath river are now busily engaged in commencing to put in cribs and are also getting out timbers for wing-damming.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Dillon, Montana.

(Continued from last issue.)

[From our Traveling Correspondent, R. G. HUSTON.]

Pacific and Black Lead.

The Pacific is owned by the same parties and is well developed, with a tunnel in 250 feet and a shaft down at the head of tunnel 90 feet in depth. They have shipped ore to Salt Lake and their lowest returns were \$60 per ton. Another shaft down on this lead 75 feet is in very good ore. This level has a peculiar formation in a regular fire clay for foot-wall.

The Black Lead is owned by the same parties and is developed to a depth of 250 feet by a tunnel. A sample lot of three tons shipped to Pascoe, of Salt Lake, and treated by him, returned \$71 per ton. They have a large amount of ore on the dump—1000 tons I should think—a low estimate. There is also a very large vein averaging 14 feet, wherever they have opened it full width. Mr. Thomas has another fine looking property here, called the Lowain; shaft down 100 feet; average width 7 feet; assays run from \$40 to \$50.

The U. S. Grant, owned by John King, was just bonded by a party named Kelley, from Idaho, the bond running to July 4th. Mr. King has been shipping ore to Omaha and Butte that has yielded him from \$100 to \$200 in return. He has from 18 inches to two feet of this high grade ore, and about three and one-half feet more of lower grade, that assays from \$30 to \$40 per ton. The parties who have bonded it for \$35,000 are now at work with a crew of men to satisfy themselves of the permanency of the mine. This mine makes a fine showing, and no doubt the Idaho parties will push it to the front as rapidly as possible.

Near by this property J. D. Heald has a ledge called the Elfrida; has a well-defined vein from 18 inches to 2 feet in width, and a tunnel in 250 feet. A shipment to Omaha returned him \$149 per ton, gold and silver. These properties are within one mile of Virginia. Mr. Heald has a number of openings in his ledge, and all are similar in width and richness. There are still a

Few Placer Miners

Gauging around the head of the gulch, under the brow of Old Baldy, as the high mountain at the head of Alder gulch is called, who are making a grubstake to go prospecting on next summer. These mines are too far up to be reached with water enough for bedrock flume, and consequently are left for the prospectors for gauging diggings in winter, as they call them.

Virginia City

Was in the earlier years of Montana the seat of government, and that same was a bone of contention between Helena and Virginia for years; but finally Helena wrested it away from Virginia, and having the most central location will probably be able to hold the fort on the capital question for all time to come.

Virginia is now but a shadow of her former self when I first visited her 20 years ago. The streets were crowded from morning until night with a moving multitude then; now everything is quiet, settled down, and most of the old-timers who have confined their operations to legitimate business enterprises, and have been moderately economical, have acquired fortunes.

The town finances are controlled by two banking firms. Henry Elling and Messrs. Hall, Harrington & Co. are both strong firms, and seem to have all the business they are looking for. In groceries and general merchandise they have Henry Werken, Elling, Knight & Co., O. D. French & Co., R. O. Hickman. Only one hotel is run at present—the Madison House. This was about to change proprietors, Mr. Barney Marshall going on deck the 1st of March. The usual breweries, saloons, livery and sale stables, barber shops and all branches of trade are represented, and all seem to be doing a steady, lucrative business.

The *Madisonian* is the newspaper of the county. This was for a long time owned and run by Thos. Deyarmon, but he has become one of the capitalists of the town through the development of quartz interests, and the paper is now owned and run by Mr. Thos. H. Baker, who is an old hand at the business, as well as one of those pleasant individuals whom it does you good to meet.

Red Bluff District.

Is in Madison county, 32 miles northeast from Virginia on the stage road to Bozeman, and has some fair prospects. The Red Bluff mine owned by H. N. Blake is developed by a tunnel 500 feet long and taps the lead at a depth of 200 feet. The average width is from five to six feet; the ore carries both gold and silver, gold predominating, running from \$80 to \$100 per ton. Blake has just signed a contract with A. M. Essler of Helena to furnish him 500 tons and was just putting on men to take out the ore.

The Mohican owned by Elling and Ward of Virginia have four shafts down to water level, which is about 80 feet. They struck an immense volume of water, and with their crude machinery are unable to go lower at present. The lead is about 8 feet wide on an average and their best ore runs from two to three hundred

dollars per ton. They are now drowned out, but both of the owners are gentlemen of ample means and no doubt will put on good pumping machinery and work their property in ship-shape.

The Golconda owned by Olds and Hickman, is opened by a tunnel run on the vein for 600 feet and depth from the surface must be 350 feet; have a four-foot vein and ore averaging \$50 per ton—very refractory. To get good, full returns, it would require a finely appointed plant, which they have not. I should think that from appearances they have as much as 10,000 tons of ore in sight. That will yield them a nice little sum when they get an opportunity to have it properly handled.

The Grubstake in the same district is owned by Pope, Bayliss and McKee. This mine is opened by three tunnels; the middle one is in 700 feet and is about 400 feet from the surface; the lower tunnel is now in some 400 feet on the ledge. Ore shipped to Omaha, returns from \$150 to \$200 per ton. Eight men are working taking out ore.

The Red Chief is a large vein from 10 to 16 feet in width, and is owned by W. F. Young & Co. They have a shaft down 50 feet, as deep as they can sink without good pumping machinery. This ledge assays from \$8 to \$150, and if works were here for the proper treatment of this ore, this would no doubt prove a profitable property.

Messrs. Pope and Bayliss have another property here, called the Tippecanoe, on which they are working six men. They are running both tunnel and shaft. They have shipped ore to Omaha and have had returns of nearly \$125 per ton. This is a large and well-defined vein. The reason that no smelters have been built here is probably the lack of good galena ores; as yet none of any consequence have been developed, and consequently they have to keep on shipping to where these are convenient.

There has been some very rich discoveries made over on Meadow creek, very high up in the mountains, in what is called the Potosi district. The snow is so deep that nothing can be done in the winter season, and the mining season will be very short, consequently the mines will need to be proportionately rich to make it a good camp. The old camp of Sterling was on Meadow creek and a number of mill properties were erected there, but at the present there are none in operation; for what reason I did not learn, though the lack of pay is the probable cause.

Poney

Is sixteen miles west of Red Bluff and is the location of a number of pretty good mines. There is a mill property here owned by Henry Elling and Morris, of Virginia City. It is run by water power, and consequently does not run in the winter season. They have been for years working the Ned mine; they are down on it some 500 feet. At times it has paid handsomely. It is a gold and silver mine. The mill is a 20 stamp one, gold process, with concentrating machinery. They are at work this winter taking out ore, and are also at work on the Boss Tweed and a number of other properties in this vicinity. H. H. Wood has a property called the Atlantic and Pacific, from which he has worked about 500 tons, that averaged \$8 per ton gold. This is a large vein, but cannot now be profitably worked.

The Gilded Age is a fair prospect; the ore carries a good per cent of galena but it is not being worked at present.

The White Pine is owned by Thos. Carnian and is now being operated by Messrs. Frank Long and Boyd under a lease. They are working and taking out ore continually; there is a ten-stamp mill on this property and it is making a good showing.

The Robert Emmet mine is owned by P. H. Leonard. Two men operated this mine on a lease and cleared \$2800 each in six months. Mr. Leonard is now taking out ore that looks very well and is satisfied with the present outlook of his property.

Armstrong Bros. have a mine that averages \$15 gold in free milling rock, and are taking out ore and doing well.

The country east of Poney is a fine grazing country and there are large numbers of stock raised here, principally horses. From here I returned to Red Bluff and thence to Bozeman, which is the county seat of Gallatin county and a beautiful agricultural town. It is near the head of the Gallatin valley and contains a population of 2500. Many fine comfortable houses are here. The wealthier class of farmers in the valley have located their families here for the benefit of the school privileges and the many social advantages of living in a town of this size. The houses are all of the modern styles and in every way would compare favorably with any Eastern town of the same size. It is on the line of the Northern Pacific and is easy of access at all times of the year.

From Bozeman I returned direct to Butte via Moreland, Gallatin City, Three Forks, and Pipe Stone Hot Springs, and had two days of very uncomfortable traveling, on account of cold weather—the first I have had on the trip, now extended to 700 miles in a buggy in mid-winter over Montana mountain ranges, crossing the main range of the Rocky mountain chain twice, and continually crossing ranges and divides running up to 8000 and 10,000 feet altitude. All things considered, I had a much pleasanter trip than I had anticipated, or than the first week out gave promise of, as I lost my traveling companion at Hecla, 10 miles above Glendale, by getting caught in a snow slide and

killed. Kind fraternal hands were here extended, and he was laid away with Masonic honors, there being no one to whom to send his remains, no one knowing where his people were, and no data on his person to show where he was from.

Nevada—Bonanzas on the Surface.

The Pick Resigned for the Shovel and the Scoop.

[From Our Special Correspondent J. B. P.]

There were strange and weird fancies that came creeping over the mind as we turned our horse's head toward the famous old desert from Wadsworth and took out upon the ancient emigrant trail. Our horse, "Cloud" by name, once an excellent piece of property in the hands of Gov. Tritle of Arizona, was still high spirited, intelligent and noble in mind, but somewhat wasted and shattered in body. He could be most implicitly relied on so far as he could render us any service, but the twenty-two miles (stock miles, doubtless, as they were given by a stockman) to the nearest house, the late hour—3 o'clock p. m.—and the possible chance of a snowstorm overtaking us on the way, gave us some slight apprehensions that we should not reach this point we aimed at. It turned out according to our apprehensions. We were to keep the main trail, and we kept it. We pushed our faithful courser on the way for four hours, and then, when from hard travel in very heavy roads, we were thoroughly benighted under a moonless sky, we found this trail was taking us into what, we afterwards ascertained, was a temporary lake. As there was apparently no side cut-off, we allowed the horse to go forward, feeling his way, until he had traveled half a mile, waist deep, into this unknown lake, and then he, too, having lost the bed of the old road, became dissatisfied and struck out, the best he could, for some shore.

As we made a successful landing among the sagebrush, we felt ourselves fortunate (the horse as well as myself). The miry condition of the soil and the cloudy night precluded the possibility of our making any discovery of the route we had lost in the lake, and as we were not particularly prospecting this piece of water for mineral, we determined on the more prudent plan of following up the high ridges of sagebrush. Two hours of fruitless labor and investigation showed that we were still some miles away from the lone house in the desert, and that common prudence dictated pitching camp for the night. A single horse blanket would not be accounted the most eligible hotel accommodations for a wintry night, but plenty of dry sage brush for a good fire rendered our condition one of comparative comfort, and we felt grateful—grateful that we had made a success in fording the lake, and grateful that we were not likely to be visited with frost or snow during the night. This was certainly far in advance of a similar encampment made on the night of the 23d of December, on our way from Mason valley to Carson City, when after driving twenty-five miles to reach a house, we had the misfortune to lose our way in the very dark night, and after adding some ten extra miles to the route, found ourselves finally corralled in the top of a mountain ridge, at a railroad cattle station, where we were compelled to pass the night with neither fire nor blanket, and with a temperature sufficiently low to congeal the earth for two inches in depth. Such mishaps cannot always be provided against where distances between habitations in some parts of the country are so remotely connected. In this State, as in California, with no guide boards at the crossings nor the principal well-worn branch roads, it frequently happens that a traveler, like the one we saw at Reno the day before we left, will start in, as he did at Wadsworth for Stillwater, and bring up at Sutro, fifty-six miles off his route. As it was, a sharp gallop in the morning showed our encampment to have been only four miles from the lone habitation on the border of the desert.

We have been somewhat minute in this description from the important circumstance that on our third day out we equally failed to get correct information concerning our route, and the lack of it enabled us to explore, by daylight, one of the most beautiful presentations of mineral wealth that the eye can survey in this or any other State. This was none of the metals, such as gold and silver, but

Borax, Soda and Salt,

All spread out over a distance of some 15 miles, in the order as stated. Coming suddenly and unexpectedly upon such a rare, rich and extensive display of these minerals, it struck us as one of the most fascinating exhibits that nature can offer to man. The perfectly horizontal plain upon which this deposit of minerals takes place is, as stated, some 15 or 18 miles in length, and varying from two to six miles in width. Having a necessity to cross the plain, where the soda formation appeared to be the heaviest, we followed the waymarks of an old telegraph line, which had been chopped down, but the stumps of which were still visible all along the air-line route. The five miles through this soda camp, with its flour-white coruscations, so strikingly resembling the blooms of dairy clover, with all its green leaves stripped off, uniformly developed to a depth of from five to eight inches, gives a vivid impression of the exhaustless resources of this

much used mineral in the earth. About midway across this alabaster-white soda plain we encountered a running stream, taking through towards the foot of the great valley, and emptying into a shallow lake. Fearing that we had struck a quantity of alkali in solution we scooped up with the hand a spoonful of this pure, crystal fluid, before allowing our horses to dip his nose into it. Of all the brine that we ever tasted, this seemed to be the quintessence. We allowed our animal then to satisfy his eager curiosity, as he had not been able to obtain a drink in a distance of 25 miles. One sniff was amply sufficient, for throwing his nostrils high in the air he gazed peeringly up that pellucid stream, as if to ascertain whence emanated such a villainous, bogus compound for water, and then, with no further ado, ambitiously resumed his wearisome trudge through the soft, deep, snow-white soda bed. Here, thought we, is soda enough for the mill, and salt also, convenient enough to give flavor to all the bread it can make. Mr. Whiteman, whom we came up with, living at Sand Springs, and who, in former years, has furnished large quantities of salt for the mills at Grantville, states that the saline creek which we crossed is from spontaneous springs, coming up from the bed of the plain below, and that the salt lake, which is several miles in extent, is refurnished wherever it is scooped up with fresh layers of loose salt to the depth of several inches. This salt is very pure, and Mr. Whiteman, the only resident 20 miles from all points, has about a thousand tons ricked up ready for use when the war on bimetalism is over, and the mills, which are located at Grantville and Austin, that have shut down on the strength of this hostility and the consequent depreciation of silver, are once more set in motion. The most remarkable feature of this trio of

A Surface Crop of Minerals

Appears to be the segregation of the whole into individual localities, each mineral having chosen, as it were, the principle of squatter sovereignty, i. e., each mineral occupying a territory of its own, with the exception of the salt stream we noticed, and each possessing properties of the greatest native purity. Borax, soda and salt in unmultiplied thousands of tons are here spread over many thousands of acres of land, and each in a field of its own choice. We do not doubt but that this immense bonanza of mineral has been, or rather is being, deposited by surface agencies, but unfortunately for this theory as applied to gold and silver, in this case it is drawn to the surface and not precipitated into the bosom of the earth by any external agency, as has been claimed for that theory by its advocates. The rim of this whole basin on either side for twenty miles is of a strongly, well defined iron and igneous formation. The rock is apparently utterly destitute of all quartz and quartzite, and partakes of something of a desolate and bleak aspect, as may well be conceived. In traversing the alkaline districts of Colorado, Idaho, Utah, Montana, New Mexico and Arizona, we have had occasion to observe extensive deposits of these minerals in the fluid and solid state before, but nothing, hitherto, in any of these territories of country, has met our attention where such a trinity, purity and extent of formation has occurred. Taken as a whole, this entire valley, which lies some forty-five miles southeast from Wadsworth, is a unique mineral floral offering of nature to humanity, of the most surprising character, and which only requires the attention of capital and railway communication to render it an exhaustless bonanza to the operator and an unlimited reservoir of supply to the warehouses and grocery stores of a nation. Minerals that always have been, and probably always will be in active demand, have here a field for their perpetual production, and the cheaper and less expensive their cost in labor the greater the comforts and economy that will be conferred upon the great mass of humanity.

Such, at least, was the nature of our reflections as on the following morning we turned our horse on the top of a four-mile rise and took in at one view the distant perspective of these varied fields of mineral wealth, that were now glittering in the radiant sheen of the morning sun, and mutely beckoning the enterprise of coming generations to gather in their ever ripening harvests.

THE *Arizona Journal Miner* says: Arizona will experience a mining boom the present year that will surpass anything that has ever been recorded in the history of mining. With the prospective raise in the value of copper and the promulgation of the many contemplated mining enterprises throughout the Territory, Arizona promises to lead the van in the production of the precious metals.

THE Marysville foundry is building a five-stamp quartz mill for Tom Green, at French Corral, Shasta county, which is to take the place of a worn-out battery in a mill at that place.

JOS. M. MCGUIRE, with Spruance, Stanley & Co., has bought the Prince mine, at Altaville, Calaveras county, for the sum of \$60,000. There are hoisting works and good light stamp mill on the property.

THE *Shasta Democrat* is of the opinion that during the past year \$300,000 worth of machinery for the mines of Shasta county has been provided.

MECHANICAL PROGRESS.

Selecting a Steam Boiler.

In our contact with engineers, users of steam and dealers in steam goods, says the *Boston Journal of Commerce*, we have often heard very positive preferences expressed for one or another form of engine or boiler. Some would swear by a horizontal return tubular, others would have nothing but a fire-box boiler of the locomotive type, while others, comparatively few but as a class quite numerous, preferred the vertical tubular. Some have tied up "for keeps" to a water-tube boiler, others will hear of nothing but a fire tube; some prefer the tubes numerous and small, others are contented with a smaller number, but must have them larger; some will have a boiler fired internally, some externally, and some even advocate removing the furnace from all contact with the boiler.

When we are questioned as to our preference in the boiler line we always require to know how, where and for what the boiler is to be used. A boiler which will furnish steam with the least expense for fuel and repairs in a New England cotton mill might be the most inconvenient and expensive that could be used in a portion of the country less favored as to water. A boiler which would furnish admirably the low pressure and quantity of steam required for heating purposes, might be entirely at a loss under the higher pressure, and the more intense combustion requisite as a source of power. The locomotive boiler is particularly adapted to its special work. It gives us the maximum of power in the smallest space and with the lightest weight, yet it would hardly be the most economical or desirable boiler, all things considered, for most stationary plants. When a man talks one boiler straight, through thick and thin, for all purposes, and in all conditions, it is safe to conclude either that he has an interest in that boiler or does not know what he is talking about.

Waste of Power.

That coal bills in manufacturing establishments may often be readily reduced by attention to things outside of the boiler-room is evident from the following, which we find in the *Boston Journal of Commerce*:

With high-speed machinery and shafting, driven at 300 turns per minute, it takes but a small resistance to waste a large amount of power. A load of only 10 pounds on a 3-foot wheel will call for one-horse-power from the coal pile, and a light belt left dragging on the pulley will offer more than 10 pounds resistance. The Emerson power scales were recently applied to the pulley where the belt, when thrown off and hung up out of the way, would rest on a short arc on the driving wheel, and it was found that this pulley required more power than was used on the machine it drove when the belt was in motion. Leather has a wonderful clinging tenacity, and wherever it is allowed to drag on the framework or guide bars, or in some of the belt-holes when the belt gets slack, more or less power will be absorbed, though the wear of the belt may not be noticeable. We have seen the set-screw of a pulley slip and draw the shaft along in the bearing till one of the larger wheels rested against a floor beam, the rim cutting into the wood and the beam, making use of the friction break in absorbing power till the line of shafting was brought into place. Belts that have been overstretched by having more work to do than they are able to manage are not apt to run true on the pulley, and where the face of the wheels are no wider than the belt they must not run very close to the framework as the projecting edges of the belt may strike and offer a large amount of resistance. When there are indications of frictional resistance by the room becoming filled with the fumes of belt grease, there is a chance for some one besides the fireman to make a saving in coal, if it is nothing more than to remove the boiler's ladder that is grinding its way into the space between the fly-wheel and brickwork.

IMPROVED BOILER FLUES.—From Germany comes an account of several boiler trials which were recently made with the view of determining the advantages, in point of fuel economy, claimed for a new form of flue. The results were somewhat remarkable and want confirmation. The flue in question differed from the ordinary form in that it was furnished on the outside with longitudinal fins which thus projected into the water and practically offered an increased heating surface. It appears from available particulars that tests with two boilers, exactly similar in design, one of them, however, furnished with plain flues and the other with the flues described, showing a saving in fuel of 34 per cent in favor of the latter, and pointed also to an increased steaming capacity. More complete utilization of the available heat is naturally to be looked for in the use of the new flue, but the figures given are much too high to pass unquestioned, and further investigation should no doubt modify them appreciably. It must also be borne in mind that the fins with which each flue is supplied afford exceptional facilities for the lodgement of mud and feed-water impurities generally, and if the trouble, expense and decreased evaporative

power entailed by the presence of heavy boiler deposits be duly taken into account, it seems probable that the balance of favor would rest with the plain flue. Should the saving, however, really turn out to be as large as that claimed, further examination would be advisable and might serve to bring into use in some places a boiler which, with all its drawbacks, would be a source of profit to its owners.

IMPROVEMENT IN ROLLING MILL TRAINS.—One of the lines in which progress is going on quietly, but with encouraging persistency, is the improvement in the design and in the adjustment of roll trains. Formerly in all mills, and now in a good many of them, the head roller was an autocent, because with his skill in adjusting the rolls he was master of the situation. Now the attention of mechanical engineers and metallurgists has been directed toward so designing the trains that as little skill as possible was needed to do his work. In some instances a point has been reached where a machinist of average intelligence may be relied upon in a few weeks' experience to occupy the place of one who once posed as a tyrant. As in many other departments of iron and steel manufacture, our rail works have led the van of progress. Only too many of our iron makers are behind in this respect. They do not sufficiently appreciate the force of the maxim that "time is iron." Every moment saved in preliminary work means an addition to capacity, and we have heard it stated by one of the leading authorities in this branch of engineering that the trains could be counted by dozens where output could be nearly doubled by modifications and improvements in design. We are doing magnificent work in rail rolling and in some of our plate and wire-rod mills, and it should be a question of only a short time to bring the majority of our merchant mills to the higher standard thus reached.—*Iron Age*.

WOODEN TURBINES.—According to *Iron Age* wooden turbines have of late been proposed to meet the demand for an efficient and cheap water motor for small powers, and there is every reason to believe that within certain limits they will meet with a very favorable reception. Turbines, it must be remembered, have the advantage of being small in bulk for their power, and equally efficient for the highest and the lowest falls, and were it not for the fact that they are constructed wholly of metal their use would probably have long since become more general. Wooden wheels can in some cases be readily procured at a comparatively low price, and, as the question of first cost and ease of repairs enters very largely into the problem of successfully utilizing small water-powers for some purposes, and is of greater importance than a high efficiency, turbines have often been unable to compete with wheels of other types. This state of things, it is thought, can be changed by using wood as the structural material, thus securing the advantages of turbines without their drawbacks, and it has been found that in this way their cost can be reduced to about one-fourth of that of iron turbines. In some parts of Europe wheels of this class have been constructed partly of oak and partly of yew, and the results are understood to have been highly satisfactory in every respect.

A NOVEL RUBBER SPRING.—At a late meeting of the Engineers' Club, of Philadelphia, Mr. Howard Constable described a novel rubber spring for tram cars, railway drawbars, buffers, and the like. It consists of a cylindrical piece of rubber with a hole through the axis, and capped at both ends with bearing plates; the draw-bar, or location bolt, of course, passes through the bearing plates and rubber spring. The peculiar feature is that a steel spring encircles the rubber, so that as the rubber is compressed it is reinforced by an increasing resistance on the part of the steel spring, which tends to hug it back to its original form. It presents some excellent features for long range, endurance, uniformity or gradation of resistance, and freedom from danger in collapse as well as economy. It is being extensively used in England, and one that has been under test by the chief engineer of the North Eastern Railway, has withstood, up to the present time, over 1,000,000 depressions of five tons. A model was shown, and it should be noted that the steel ring is not solid, but laps over itself, so that the ends slide over each other as the rubber presses the spring outward; also that the section of the spring can be U, W, or other shape.

COMPRESSING AND TOUGHENING TIMBER.—By a new process of toughening wood it is claimed that the effect produced upon white wood is such that a cold chisel is required in order to split it. This result is accomplished by a special method of steaming the timber and submitting it to end pressure, technically "up-setting it." By this means the cells and fibers are compressed into one compact mass, and it is the opinion of those who have experimented with the process that wood can be compressed to the extent of some 75 per cent, and that some of the timber now considered unfit for use in such work as carriage building, for instance, can be made valuable by this means as a substitute for ash, hickory, etc. Of course, the process is applicable only to wood in comparatively small quantities, such as is intended for use for tool handles, and carriage or wagon work, etc.

SCIENTIFIC PROGRESS.

How a Trap-Door Spider Builds His House.

An Eastern lady correspondent of *Science*, Mary T. Palmer, recently received a female trap-door spider from California, which she placed in a box of earth, where the spider soon commenced the work of building herself a house after her original Californian model. The correspondent writes: She was found one morning occupying a hole three-quarters of an inch in diameter and deep enough to completely hide her, around which the ground had been cleared and smoothed so that it was somewhat lower than the general level. Unfortunately, as this work was done during the night, she accomplished it unobserved. She probably cleared the ground, however, as she had done on a former occasion, by walking slowly sideways, with all the feet on one side held together, turning slightly at the same time, and sweeping all rubbish and coarser bits of earth before her. In digging the hole she threw the earth to a distance, as was shown by numerous little irregular lumps of earth scattered over some moss farther on the side of the box. Later the spider was seen to dispose of more in the same manner, but it was done so quickly that the exact motion could not be distinguished.

During the day she busied herself in the burrow, apparently treading against the sides in order to make a compact wall. At night she rested, and nothing more was done until the following evening when she commenced to build a straight ridge or rim of earth at one side of the hole. She brought up as much earth as could be carried under the mandibles and placed it on top of this rim. When it had been secured by several strokes of the fangs the spider turned and rubbed the spinnerets over the spot and afterwards all along the edge. The spinnerets were applied directly to the surface, and were used not only to produce the silk but also to smooth and model the edge.

This process was repeated until the rim was about a quarter of an inch in height, when the spider left it and commenced a similar one on the opposite edge of the hole. Here she worked, as before, until she had made a ridge about half as high as the other, when she returned to the first, and during the next hour added to them both alternately. At the end of that time she brought up the first load of earth which was not used in building, and deposited it as far away as she could reach, without leaving the burrow. As she withdrew she turned and attached a line of web to the edge of the second rim, by which it was pulled over the opening after she had disappeared from sight. Henceforth it was necessary to lift and turn back this rim (or flap as it might now be called, to distinguish it from the true door) whenever she came up, unless, as sometimes happened, she had neglected to pull it down.

In the mean time, the first rim, which was to become the true door, had been gradually enlarged; but another hour elapsed before any attempt was made to pull it down. The spider then fastened a line to the upper edge, by which, after a long and steady pull from below, the structure was dragged over the opening, which it only half covered. It was immediately raised and carefully re-adjusted in an upright position. After another half hour, devoted to adding more earth to the two rims alternately, the first was again drawn down; but, being still too small, it was once more returned to the old position, and the work of enlargement continued. As nothing but persistence in this course seemed necessary to complete the door, the spider was allowed to work the rest of the night without supervision.

In the morning the spider had vanished. The entrance of the nest was closed, and the depression around it filled, so that its position was perfectly concealed. Naturally, it was supposed that the door was finished; but the next night proved this conclusion to be erroneous. When the spider was visited at 3 A. M., the door covered only three-quarters of the opening, and she was still employed in adding earth to the edge. During the day the entrance had evidently been closed by the true door and the flap, used together as a double or folding-door, one side being much larger than the other. The flap, no longer needed as a cover, was now turned back and pushed away, the opening thereby being considerably enlarged. More earth was subsequently placed over and around it, until it was completely hidden, and rendered useless. Before morning the true door had attained the necessary size, and the lining had been added to it; but the lining of the burrow was not entirely completed until some days later.

A piece cut from this door showed it to be a layer of earth with a single lining; while an old nest which came with the spider, and which she presumably made, was provided with a door having nine linings, each of the eight lower ones enclosing a rim of earth, by which the door had been enlarged.

A PREDICTION AND ITS FULFILLMENT.—Florence, the actor, was once in a company where Morse, the telegraph inventor, was also present, and in quite a talkative mood. Of course, he was very enthusiastic over his own great invention, and in the course of his remarks said: "Some day men will be able to talk over the

wires for distances of 50 miles, and every ship on the ocean will, in effect, be connected with the land by wires." If the entire prediction has not been fulfilled, recent discoveries in electricity have come very near it, for it is quite well settled that passing ships may now talk with each other by means of trailing wires, which is almost like being connected with terra firma.

Relative Strength of Wet and Dry Timber.

In reply to a statement by the *American Miller*, that "wet timber is not as strong as dry, in some cases it has not half the strength of dry," a correspondent of that paper writes as follows: "In September, 1876, the Lanesboro mills, Lanesboro, Minn., burned, and that fall we rebuilt them and began making flour the next March. We used sawed pine (taken out of the Mississippi river) for joists, 3x12 inches, 12 feet long, and sized them, laying them on top of the girders, to get their full strength, and then used 4-matched flooring. The joists were placed 12 inches from center to center, leaving 9 inches between them. In the fall of 1877, we piled wheat on the floor 26 feet deep in the bins, and the joists, yet wet and green, only sagged a trifle, and carried the immense weight safely. Two years later the same joists were dry, from the heat of our very large stove. We loaded the floor with 24 feet of wheat and six joists broke off nearly square in the middle, and others were cracked. In the first instance the bins held 360 tons of wheat while the joists under them were green. When the joists were dry 300 tons or less broke several of them. This shows that green pine is stronger than dry pine, as the wood becomes brash or brittle by drying and is not as strong as when green. This is caused by the sap drying and leaving only solid matter in the capillary tubes, and they cannot move one on another, while if the timber is green the tubes are full of water and can bend or move one on another. I know of but two kinds of wood that are stronger dry than green, and they are maple and white oak.

INSECT INTELLIGENCE.—An account of a singular habit in the cicada (locust) is related and illustrated by J. S. Newbury, in the *School of Mines Quarterly*. A cellar had been dug and house built at Rabway, N. J., a short time before the appearance of a brood of cicadas. The unused cellar was opened about the time of their advent, and the bottom was found thickly covered with mud cones or tubes from six to eight inches high and an inch or more in diameter, each of which had been formed by the pupa of a cicada that had emerged from the earth beneath the cellar. The undeveloped insect finding itself in a dark place, and apparently desiring to work up to daylight, had taken the moist clay and formed it into pellets with which it had built up the tubes, apparently with the purpose of bridging over the darkened vacancy and thus reaching daylight. The tops of all the cones were closed, but on breaking some of them the pupae were seen both in the hole in the ground and in the cone. After the cellar was opened and light admitted, they stopped building and made holes in the tops of the cones for exit. The author further remarks that in these facts there is evidence of the exercise of intelligence in the cicada, and a judicious adaptation of means to an end in circumstances that, it would seem, must have been without precedent in the experience of that or any preceding generation, and therefore for which no education of ancestors could have given a preparation. It is possible that the pupa of the cicada is sometimes embarrassed, in its ascent to the surface by water, by too wet or too dry sand or mud; but it is hardly possible to imagine circumstances where the construction of a tunnel would be necessary. There seems to be no adequate explanation of the phenomena that will bring them within the scope of the theory according to which all our organs and faculties are the result of formative influences progressively developed through a long line of ancestors.

SENSE OF SMELL IN INSECTS.—Professor Graber has made an extensive series of experiments on the degree and localization of the sense of smell in insects, etc., from among the results of which the following will be found of interest: Odors are perceived by many invertebrates, such as mollusks, insects, etc., with extreme rapidity, sometimes in one-third of a second, and even through an intervening layer of water a half-millimeter in thickness. Insects deprived of their antennae are still able to smell, but in varying degrees in different insects and for different odors. In some cases the palpi of the mouth organs are more sensitive than the antennae, and therefore the latter cannot be considered as being alone the organs of smell.

PHOTOGRAPHY IN MEDICAL PRACTICE.—Some novel and interesting applications of instantaneous photography to the study of the movements of the heart and intestines have recently been made by Dr. W. G. Thompson. Photographs of rabbits', pigeons', cats' and frogs' hearts were made, showing the action more clearly and accurately than is possible by other methods. In addition to the value of such in physiological teaching, the most practical application of the method will be the illustration of the changes in the form of the heart and intestines produced by drugs.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, April 3, 1886.

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Passing Events.

Spring has now fairly opened and the miners who have, in the higher parts of the coast, been in the camps and towns all winter, will now be able once more to start on their prospecting trips. This promises to be quite an active mining season, more particularly in the northern part of this State, which, for years, comparatively neglected, is now coming to the front once more.

The capture of Geronimo and his Apaches, by Crook and Maus, and his subsequent escape with his braves, again directs attention to the Indian question in Arizona. As long as these marauding Indians are at large, portions of that region must be unprospected. Their presence now prevents immigration and retards mining development in the region they infest.

The excitement about gold on the Yukon and Stewart rivers, Alaska, is a renewal of that of last year, though so far, little is known of the richness of the region, aside from vague reports.

The low railroad fares and freights continue, and hundreds of tourists are coming to California, many of whom will settle here. Opportunity is also given to ship East our home products. Among other things, chrome ore is now being forwarded by rail to Baltimore, so that mines formerly of little value are worked to a profit.

Opening Deep Mines.

In the volume on "Precious Metals," of the census reports, in discussing the questions concerning the development of deep mines, a table is given showing the manner of opening deep mines, in the various States and Territories. Without quoting this in detail it will be of interest to take the totals of the various methods. The officers report on 920 mines. Of these 195 are opened by shaft; 86 by incline; 91 by shaft and incline; 202 by shaft and tunnel; 40 by shaft, incline, and tunnel; 1 by shaft, incline, and open cut; 12 by shaft, tunnel, and open cut; 2 by shaft, incline, tunnel, and open cut; 151 by tunnel; 49 by tunnel and incline; 20 by tunnel and open cut; 6 by incline and open cut; 3 by incline, tunnel and open cut; and 50 by open cut alone. Of the 85 California mines, 23 are opened by shaft, 17 by incline, 9 by shaft and incline, 7 by shaft and tunnel, 21 by tunnel, 7 by tunnel and incline, and 1 by shaft, incline and tunnel. Most of the work is by shaft, or tunnel, and the majority by shaft and tunnel.

Opening a mine by a tunnel involves the expenditure of less capital than sinking a shaft. It is therefore the natural system of prospecting where practicable. Before mining machinery had reached the perfection which it has attained during the last few decades, it was often the only practicable method of draining and working even large and profitable properties.

Of late years, however, this method of opening mines has been less and less practiced all over the world. The cases reported in the table quoted as opened by shaft and tunnel, are seldom those where tunnels have been run for drainage, but almost always those which have been opened as prospects by tunnel, a shaft having afterward been sunk; and the figures show that less than a quarter of the whole number of mines are practically worked by tunnel.

In Nevada, where deep mining is carried to a greater perfection than in most of the States, only one-sixth of the mines are worked by tunnels. Had the standard of mines reported on been lower, the proportion of tunnel mines would have been far greater, and *per contra*, had the standard been higher, there would have been a greater proportion of shaft mines.

In very small mines an incline is sometimes sunk on the dip of the vein for prospecting purposes, but these are usually only temporary. In larger mines, those for example on the Comstock lode, an incline is often run on the dip of the vein from the bottom of a vertical shaft, when for any reason it is undesirable to penetrate the footwall. This method, however, has many inconveniences, and of late many engineers prefer under such circumstances to crosscut into the hanging country rock to a suitable distance and sink a blind shaft vertically to a lower level. This hoisting is then done by compressed air. Open cuts, except for prospecting purposes, are very rare. In Idaho, however, the Custer and other mines show large bodies of quartz exposed by erosion, and are therefore capable of this simple method of working.

Another table, interesting in this connection, is that showing the extent of workings. Out of 825 deep mines reported upon, the total length of shafts and inclines aggregated 399,686 feet; total length of tunnels and galleries, 1,992,191 feet; winzes and upraises, 221,071 feet; greatest vertical depth of workings, 3027 feet; greatest horizontal development, 4000 feet. The totals in miles, neglecting fractions, would be as follows: Total length of shafts and inclines, 76 miles; tunnels and galleries, 377 miles; winzes and upraises, 42 miles; total, 495 miles. The tunnels and galleries include all horizontal workings known as adits, levels, tunnels, drifts, crosscuts, etc. Nevada leads all others in this table, having 119,547 feet of shafts and inclines, 794,914 feet of tunnels and galleries, and 100,133 feet of winzes and upraises. She also shows the greatest vertical depth and greatest horizontal development.

The shafts have from one to five compartments, and these are from 3 by 4 feet to 6 by 7 feet in the clear. The tunnels vary from 3½ by 5½ feet to 12 feet by 9 feet in the clear.

The census officers think that the totals we have quoted represent three-quarters of the entire length of mine workings of the country which were in operation in the census year. Taken together, the tables indicate the extent of the mines, all of which, it must be remem-

bered, have been opened within about 25 years, and most of them within a shorter period.

Except on the Comstock there are no mines over 2000 feet in depth, and thus there are some over 3300 feet. The Adalbert shaft, at Pribram, Bohemia, is 3350 feet deep. But while mining on the Comstock began in 1859, the Pribram mines were opened in 1527, and have been worked more or less actively ever since.

On the Comstock mines the length of drifts, crosscuts, shafts, inclines and winzes aggregate over 185 miles. On that lode the average size of drifts is 6x7 feet; average size of single winzes, 6x7; average size of double winzes, 12x7; average size of shafts in the clear, 5½x15; area of excavation of the Forman shaft, 8½x28; area of excavation of the Combination shaft, 9x28; area of excavation of the Yellow Jacket new shaft, 9½x23; area of excavation of the Oshiston shaft, 8½x23; average area of excavation of the old shafts, 8x20 feet.

No Danger of Overproduction.

There is one product of California, at least, in which there is no danger of overproduction—that is gold. Being a standard of value all over the world, more or less annual yield does not affect it, and even when discovered in unusual quantities it is not depreciated. This State has the most productive gold fields of the whole world, and notwithstanding this comparatively decreased yield of late years, still maintains the leading position. California yields more gold every year than all the other States and Territories put together, and exceeds Australia, Africa, Brazil and Russia.

But Californians have been so accustomed to this, and take it so much as a matter of course, that many of them are too apt to consider it of comparatively little importance. Because fortunes have been lost in the stock jobbing operations of silver mining, they are apt to class all mining in the same category as speculative and uncertain. And with this feeling prevalent they neglect the opportunities at their very doors, and permit to lie undeveloped ground which in other countries would be immediately prospected and worked.

But there are men who realize the advantages they derive from living in a gold-producing country like this, and who invest their money in opening mines. Many of them have made, and are making, fortunes from their enterprise. Moreover, observing men who have of late come to our shores see on many sides opportunities which have been neglected by our own residents, and are taking advantage of our apathy. Eastern people are now putting money in our gold mines, and re-opening old ones which had been abandoned. In San Diego county, for instance, up in Julian and Banner districts, in the Cuyamaca mountains, Eastern people have taken hold of claims which had been abandoned, and by putting in their money wisely have brought them to a paying basis.

The truth is our quartz mining industry is in better condition to-day than it ever has been. The cessation of work on the hydraulic mines has caused attention to be turned to quartz, and the depressed prices of silver, lead and copper have made mining men look up the gold fields. All over this State quartz mines are being opened and developed. Every successful one draws attention to its locality, giving opportunities for other mine-owners near by to dispose of their prospects.

Cooling of Lead Slags.

The more slowly a newly-drawn pot of slag is cooled the more perfect will be the crystallization. Such slowly-cooled slags have a certain fixed fusing point, and are generally only imperfectly soluble in any of the strong mineral acids. The slag upon breaking open a pot ordinarily shows a well defined crystallization when the type is closely approached, and on the outer edge there will be a thin crust or scale of glassy material. If slags are cooled rapidly the crystallization will be imperfect, and if very rapidly the structure is entirely changed and often crystallization is entirely absent. If melted slag is either poured or plunged into water, the crystallization is entirely prevented, and the mass (if not in too large quantities) will show a glassy appearance not unlike obsidian. Slags thus rapidly cooled have suffered a very remarkable and hitherto unrecorded change;

they will be found to have a much lower fusing point, and by powdering them they will be found to be entirely soluble in any of the strong acids, especially in hydrochloric acid. By taking advantage of the last named fact it will readily be seen that fusions for the analysis of slags are entirely unnecessary in connection with this industry.

It is generally customary at lead smelting works to turn a stream of water on the slag trough or "slag runway" soon after tapping a pot of slag, thus chilling and rendering brittle that portion which has adhered to the trough, and this is almost always thrown away, injudiciously as is thought by Mr. M. W. Iles (in a chapter on the subject in the "Mineral Resources of the United States," since this portion will not only contain many matte globules but also very often pellicles of lead which may have lodged upon the trough, either from a "blow pot" or from a leaky breast. This rapidly cooled slag is not only generally richer, therefore, than the main body of the slag, but, if for no other reason, it should be saved for these uses: It melts at a very low temperature and hence is valuable for "blowing in" a furnace; to be fed after "harring the hangings," and it also serves a most admirable purpose in keeping down or preventing the so-called "over fire" or "fire top."

Mining Accidents.

Mr. Geo. Felmeth, while working at the Zeile mine, Amador county, fell down the shaft a distance of about 50 feet, and was quite severely bruised up, but fortunately his injuries were not of a very serious nature. It is considered almost a miracle that he escaped with his life.

It used to be a very common accident to have the cage drawn up into the shieves, but of late years more precautions are taken around the hoisting works and we do not so often hear of injuries from this cause. At the Anaconda mine, in Montana, however, the other day the cage was drawn up into the shieves and Jerry Mullen killed and W. J. Elmer seriously injured. Mullen was head blastman and Elmer station tender at the 300-foot station. The blastman had gone down to the 1000 foot level and fired a series of holes, in the usual manner, with an electric battery, and after the smoke had cleared away he and Mr. Elmer went down to the station and gathered up the wire attached to the battery, placing that and all of their other appliances upon the upper deck of the cage. Mullen gave the usual signal to hoist to the 300-foot level, which was done by the engineer, and after a pause of a couple of minutes, the latter states, the hell was again rung, indicating that the men desired to be hoisted to the surface, and they were started up. The dial of the indicator is traversed by the finger in making 800 feet up or down the shaft, necessitating a lap for the other 200 feet, and the engineer made the fatal mistake of supposing that the men were at the 1000-foot instead of the 300, and when he started his machinery in motion he stooped down to adjust a lubricator. He only took a few seconds, and as he raised up to his throttle the cage shot up out of the shaft and into the shieve before he could check it. Both men were thrown out to the floor below, a distance of about 50 feet, Mullen striking flat upon the iron plates, while Elmer was thrown into one of the empty cars standing there. The brakemen and carmen rushed to their assistance, while the engineer, Hassinger, at once left the works, probably fearing bodily harm at the hands of the miners, whom he knew would be greatly incensed at the result of his carelessness.

There is a lesson in this accident for other mine managers. The engineer, at the inquest, testified that he hoisted the cage from the 1000 foot level to the 300; he then after awhile heard three bells, which means hoist men to the surface. When he started the engines he supposed the cage was at the 1000-foot level, but it was at the 300-foot level. He looked at the indicator needle and it was coming by the 1000 mark, so he thought it was all right. The jury returned a verdict that "the said Jerry Mullen came to his death by being thrown from the cage on the west shaft of said mine in consequence of the engineer, H. B. Hassinger, not having observed the situation of the cage as noted by the indicator, and we believe the accident would not have occurred had the indicator registered 1000 instead of 800 feet."

Silver and Gold from Black Copper.

No. 4. The Silver and Gold Residue.

The mud which settles is composed of some subalts and both silver and gold in a fine state of division. The mud, after two or three operations is washed out through the pipe into two vats below, one meter square and 1.50 meters deep. When enough is withdrawn it is pumped by steam through a filter press with six filters in each press and washed with water in the press. The cakes are dried and sent to the silver works. They contain most of the gold, from 2 to 4 per cent of silver, with some gypsum, and the oxides of lead, arsenic and antimony.

Crystallization of the Copper Sulphate.

As soon as the liquor has settled it is siphoned off to the crystallization vats on the floor below. There are twelve of these vats to each solution tank. They are all lined with lead. One tank full fills a vat, and one vat is emptied of its crystals each day, so that the liquor remains 12 days in each vat. There are 36 of these vats. They are built two together, and supported on the sides and bottom by braces 0.15 meter square and held by iron rods at the top. They are 3.75 meters square and 1.05 meters deep.

On the top of each of these vats are 25 poles with five strips of lead, .004 meter thick and .002 meter wide, hung on them and reaching to the bottom of the vat. Here liquor is allowed slowly to crystallize. The largest crystals collect on these strips, the next on the sides of the vat. On the bottom small crystals often collect, which are taken out with a scoop and recrystallized. When the crystallization is complete the mother liquor is drawn off to be used again in the solution of the copper and of the first copper crystals. The crystals are collected from the strips first and then from the sides. When taken off they are put down on one corner of the vat until they are all collected. They are washed with water and are dried in a large room which is kept as dark as possible to prevent the decomposition of the crystals. This room is kept heated at 20° R. This is considered essential, as copper sulphate easily loses part of its water, and then becomes opaque. As the only judgment of the quality is by the eye, this makes them look badly, so that they are not easily sold. There are three shelves around the room for drying the crystals, each of which is two meters wide. The highest shelf is two meters above the ground. The crystals are first carefully sorted. The large ones are sold, the small ones kept for use at the works. They are arranged in doubly inclined rows at right angles to the edge of the shelves, so that they can be easily turned over to dry them. Three categories of crystals are made, two of which are sold. They are arranged mostly as to size. They are packed in barrels which weigh 250 kilograms and kegs which weigh 50.

In the course of the process it is found that every kilogram of granulated copper produces 3.80 kilograms of blue vitriol. It requires for its solution 2.40 kilograms of sulphuric acid at 50° B. Six solution tanks, two boiling vats, and 24 crystallization vats can produce from two and a-half to three tons of blue vitriol in 24 hours. The injectors are all of lead with the points made of hard lead.

To use this process it is necessary that the copper should be nearly free from iron and nickel, as these metals concentrate in the process and would at least injure the quality of the metals unless there is enough of them to make a special treatment for them with the concentrated liquors; that sulphuric acid should be abundant and cheap, and that there should be a ready sale for the copper sulphate crystals. The presence of small quantities of arsenic, antimony, and lead does not interfere with the process, and it is therefore applicable to very impure black coppers, or to those which are very rich in silver and gold.

As the acid mother liquors are constantly used over again there is but little loss of sulphuric acid. Most of what does not go into the copper sulphate is used again. These mother liquors can, except in the cases mentioned, be used indefinitely. This process is simple, requiring but little intelligent labor.

About 200 tons of the steel plates for the platform of the dry dock now building by the Union Iron Works has arrived, and the remainder is well on the way. Work is being prosecuted vigorously, and it will only be a question of a short time when vessels can dock and repair in it as cheaply as at other ports.

A Storm Shield Dress.

We recently noticed in these columns the issuance of a patent through the Mining and Scientific Press Patent Agency, to Mrs. Maggie Boyd, of Riverside, and now give illustrations of the invention. This novel storm shield, head umbrella and skirt protector, as it is termed by the ingenious inventor, consists of a body piece or cape, the lower portion of which fits across the back, and has an extension hanging down a short distance behind, so as to cover the rear upper portion of the skirt. The



STORM DRESS FOR LADIES.

front portion of this cape is brought together and secured around the neck, and it has secured to it the breast piece, which extends downward across the chest of the wearer, and has the lower end secured to the front of the skirt by clasps. The chest piece is lined with woolen

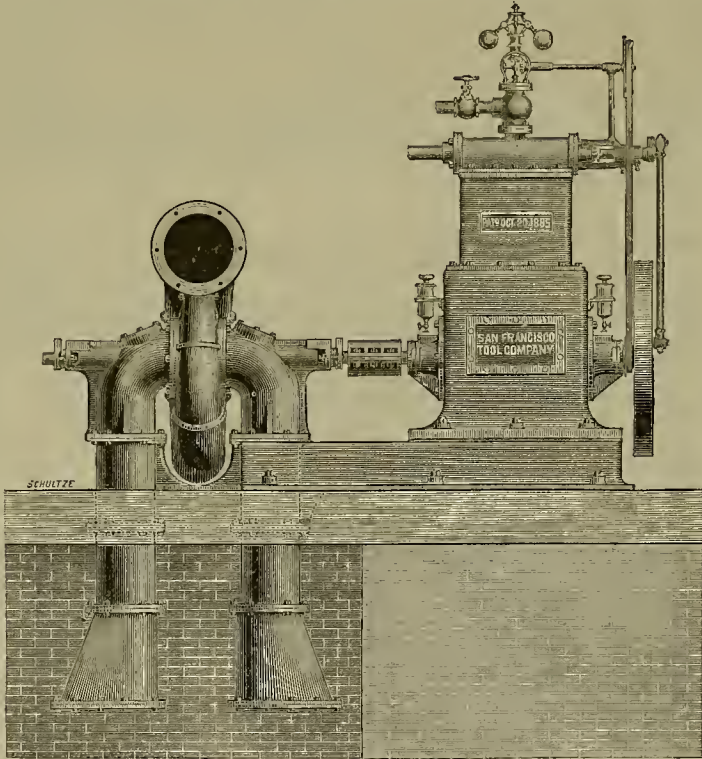
tension of the same material of suitable length, the end of which is folded and provided with fastenings, to be secured to the under or flannel skirt, when in use. The skirts are then all enclosed within this protecting extension, and are prevented from becoming wet or muddy while walking. When this device is not in use, it is clasped to the water-proof skirt and secured, so that the whole device would lie outside of the ordinary dress skirt.

This device is indorsed for its health-giving and health-protecting properties. It is a complete shield against wind, rain or hail storms, and the wearer can walk miles and be kept snug and dry.

The ladies or children who wear this over-dress are completely protected, yet they have plenty of ventilation. The chest is covered and the veils are held tight on the inside of the breast piece, so the rain cannot touch the face, and in winter this piece is lined with woolen, so the fingers never get numbed as in holding an umbrella. It is made of the odorless India rubber gossamer, and the hood or umbrella is lined with all shades to suit the complexion and can be worn over the most stylish costumes and not injure them. The hood does not fret the neck like the old style. The umbrella or hood is folded in a pretty shape and the dress is laid in one side and clasped together by a cord, and attached to chain with clasps, and worn at the side as a satchel. The device is quite ingenious and useful, forming a very sensible addition to a lady's wardrobs.

Pump and Engine.

The engraving on this page represents a 15-inch centrifugal pump, with high speed engine, directly connected to the pump, thereby dispensing with expensive belting or gear. This class of engine is particularly suited for steamer use, by reason of the small floor or deck space



15-INCH PUMP AND ENGINE FOR LOW LIFTS.

or other fabric, and the lower edges of the cape are drawn across the outside of the front and secured by rings in the lower edge of the breast piece. This prevents any entrance of rain or wind.

The head piece is composed of rigid extension pieces, similar to those used for an umbrella. Around the interior and front of the umbrella and secured to the lower edge are veils, each one crossing over the head on opposite sides and passing through a ring, by which it may be drawn down to form the hood. These ends pass around under the chin, and may be tied there so as to secure the umbrella in place and prevent its being blown off by the wind. The veil may be held in front.

The skirt portion is secured around the waist, and drops over the ordinary skirts or clothing which are worn, and it has at the rear an ex-

occupied. The shaft of the engine is made of steel, and the connecting rods of bronze. The cylinders are jacketed, and every precaution taken to save steam and cost of running. All working parts are made easy of access, and can be easily duplicated when worn out.

The pump is so arranged that it is firmly secured to the same bed-plats as the engine, thereby forming one solid structure, enabling this engine to dispense with heavy and expensive foundations. Hand-hole covers on each side of pump give easy access to interior of pump for examination of runner, or removal of foreign matter. The suction and discharge pipes can be made to suit any desired position. This type of engine and pump is made by the San Francisco Tool Company. One of them is now doing very good service at Rough and Ready island, below Stockton. The plant is

intended for low lifts, and has a capacity of 10,000 gallons per minute. These pumps are well adapted for irrigation, drainage and water works, and can also be used in surface or river-bed mining operations, or such places where large quantities of water have to be handled at a short lift.

Foundry Notes.

The Pacific Iron Works report a very considerable demand for mining machinery, with a more encouraging outlook than for some time past. Among their more recent shipments are a ten-stamp dry crushing roasting mill for the Gonzales Company at San Antonio, Mexico; a ten-stamp gold mill for Tehuantepec, Mexico; a 20-ton roller mill for Querobahi, Sonora, Mexico; a ten-stamp gold mill for the Southern Belle mine of Arizona; a 30-ton smelting plant, revolving dryer, etc., for the Trinidad Company of Sonora, Mexico; a revolving dryer for the Ventanos Company of Durango, Mexico; a gold mill for Chili, equipped with Duncan concentrators. Also large shipments of these machines to various parts of Central America, South America, Mexico, as well as to various points in California, Arizona, Oregon and Washington Territory. The success that has attended the introduction of the Duncan concentrators in the more prominent mining districts of this as well as many foreign countries, indicates it to be a saving appliance for working base ores of practical value and utility.

The Pacific Rolling Mills, of this city, are now making a specialty of constructing the iron work, etc., of the road bed of cable roads. Not long since they rebuilt the western section of the California street cable road, doing the work without interfering with the regular traffic over the line. They have also done this class of work on other roads, and now have a contract on the new Oakland cable road, from Seventh and Broadway out San Pablo avenue. The road will be a double track and the cable five miles long. Some 4000 barrels of Portland cement have already been purchased and stored, and as much additional will be required. The road will be of steel and concrete. The steel yoke is bent to support the chains upon which the wheels rest. Against this yoke, inclined at an angle, will rest two braces, riveted, and strengthening the slot through which the grip passes to grasp the cable. Between the yoke and the braces concrete will be packed, thus forming a solid and immovable foundation for the pavement. These yokes and braces will be placed at intervals of three feet six inches throughout the entire length of the road. Power will be furnished by two Corliss engines, each of 400-horse-power, and both of the latest and most improved pattern. Only one engine will operate, however, the other being held in readiness for use in case of accident. All this material is ready for the road, and much of it is already on the ground, 100,000 feet of lumber having been purchased for the construction of the necessary buildings and sheds.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

- FOR WEEK ENDING MARCH 23, 1886.
- 338,629.—VERMIN EXTERMINATOR—F. E. Browne, Los Angeles, Cal.
 - 338,395.—WHEEL PLOW—M. G. Farnham, Germantown, Cal.
 - 338,591.—PUMP—J. P. Ford, Frazier, Cal.
 - 338,401.—GATE—M. B. and W. Y. Gordon, Davisville, Cal.
 - 338,402.—TOOTH BRUSH HOLDER—N. W. Griswold, Alameda, Cal.
 - 338,353.—FAUCET—D. & T. Morris, S. F.
 - 13,120.—TRADE MARK—J. J. Mack, & Co., S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

SETTLER'S GUIDE.—Henry N. Copp, the land-lawyer of Washington, has just issued the tenth edition of his "Settler's Guide." It is a useful book for all who are, or expect to be, interested in public land. A chapter, illustrated with numerous cuts, shows how to tell township, section, and quarter-section corners, and explains the system of surveys. It gives Commissioner Sparks' orders and several late decisions and instructions, and full information about the homestead, pre-emption, timber culture, desert land, and other laws. The price of the book is only 25 cents.

PRACTICAL HYDRAULICS.*

NUMBER 24. COPYRIGHTED.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

TABLE 27.

Flow of Water per Second in Open Streams, the Coefficients of Roughness of whose bed is $n=.012$.

Hydraulic Mean Depth, $\frac{A}{P}$	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.
.25	1.241	1.330	1.415	1.494	1.541	1.632	1.710
.3	1.423	1.526	1.623	1.713	1.780	1.884	1.972
.4	1.761	1.898	2.007	2.118	2.206	2.326	2.430
.5	2.072	2.220	2.359	2.489	2.606	2.746	2.868
.6	2.358	2.526	2.685	2.833	2.969	3.138	3.288
.7	2.629	2.815	2.991	3.154	3.277	3.468	3.638
.8	2.883	3.088	3.257	3.459	3.570	3.784	3.968
.9	3.127	3.348	3.556	3.750	3.856	4.092	4.296
1.0	3.360	3.596	3.820	4.028	4.146	4.404	4.628
1.25	3.902	4.176	4.435	4.676	4.788	5.076	5.320
1.5	4.403	4.710	5.001	5.272	5.386	5.704	5.968
2.0	5.302	5.671	6.018	6.344	6.458	6.816	7.096
2.5	6.107	6.531	6.851	7.154	7.268	7.656	7.956
3.0	6.843	7.317	7.674	8.010	8.124	8.544	8.864
3.5	7.525	8.044	8.436	8.892	9.006	9.456	9.776
4.0	8.165	8.727	9.151	9.533	9.647	10.128	10.448
4.5	8.769	9.372	9.826	10.172	10.286	10.796	11.116
5.0	9.341	9.983	10.466	11.015	11.129	11.664	11.984
5.5	9.888	10.566	11.020	11.800	11.914	12.464	12.784
6.0	10.411	11.133	11.729	12.441	12.555	13.128	13.448
6.5	10.911	11.666	12.336	13.022	13.136	13.728	14.048
7.0	11.400	12.177	12.911	13.600	13.714	14.328	14.648
7.5	11.877	12.668	13.444	14.166	14.280	14.912	15.232
8.0	12.342	13.136	13.966	14.700	14.814	15.464	15.784
8.5	12.796	13.633	14.455	15.222	15.336	16.000	16.320
9.0	13.241	14.099	14.944	15.733	15.847	16.528	16.848
9.5	13.677	14.541	15.411	16.233	16.347	17.056	17.376
10.0	14.102	14.977	15.877	16.711	16.825	17.560	17.880
11.0	14.811	15.811	16.766	17.644	17.758	18.496	18.816
12.0	15.566	16.611	17.611	18.544	18.658	19.424	19.744
13.0	16.268	17.338	18.422	19.411	19.525	20.288	20.608
14.0	16.974	18.133	19.211	20.288	20.402	21.152	21.472
15.0	17.644	18.844	19.977	21.152	21.266	22.016	22.336
16.0	18.299	19.533	20.711	22.016	22.130	22.880	23.200
17.0	18.934	20.211	21.433	22.880	22.994	23.744	24.064
18.0	19.554	20.888	22.155	23.744	23.858	24.608	24.928
19.0	20.164	21.555	22.877	24.608	24.722	25.472	25.792

PRACTICAL APPLICATION OF TABLES 27, 28 AND 29.
TO DETERMINE THE VELOCITY AND DISCHARGE OF AN OPEN STREAM OF WATER.

Rule 56.—From the given dimensions of the stream find by Table 28 or Table 29, according to the conditions, the hydraulic mean depth. Turn then to Table 27 for the given coefficient n , for roughness of bed.

TABLE 27.

Flow of Water per Second in Open Streams, the Coefficients of Roughness of whose bed is $n=.017$.

Hydraulic Mean Depth, $\frac{A}{P}$	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.
.25	.067	.1704	.2615	.3566	.5004	.5844	.6597
.3	.0675	.2006	.3051	.4595	.5800	.6769	.7582
.4	.0857	.2563	.3877	.5796	.7296	.8469	.9577
.5	.1095	.3110	.4657	.6922	.8691	1.0111	1.138
.6	.1301	.3628	.5422	.8176	1.012	1.167	1.307
.7	.1503	.4109	.6185	.9451	1.123	1.305	1.467
.8	.1702	.4612	.6978	.1051	1.240	1.441	1.619
.9	.1892	.5079	.7733	1.168	1.355	1.572	1.766
1.0	.2093	.5585	.846	1.176	1.465	1.698	1.937
1.25	.2569	.6625	.9565	1.398	1.722	1.939	2.256
1.5	.3034	.7659	1.097	1.581	1.957	2.269	2.544
2.0	.3994	.9551	1.356	1.939	2.398	2.763	3.109
2.5	.4802	1.136	1.592	2.338	2.793	3.221	3.605
3.0	.5629	1.302	1.812	2.563	3.157	3.508	4.058
3.5	.6457	1.460	2.018	2.843	3.496	4.025	4.509
4.0	.7253	1.619	2.213	3.100	3.816	4.430	4.966
4.5	.8030	1.753	2.455	3.353	4.119	4.795	5.291
5.0	.8590	1.890	2.676	3.594	4.467	5.064	5.657
5.5	.9533	2.023	2.745	3.824	4.683	5.379	6.074
6.0	1.028	2.101	2.910	4.044	4.944	5.632	6.344
6.5	1.093	2.275	3.068	4.256	5.204	5.973	6.667
7.0	1.168	2.394	3.220	4.460	5.450	6.253	6.973
7.5	1.238	2.512	3.372	4.656	5.690	6.526	7.264
8.0	1.307	2.582	3.433	4.851	5.921	6.780	7.575
8.5	1.373	2.740	3.570	5.038	6.147	7.047	7.861
9.0	1.439	2.845	3.790	5.220	6.365	7.296	8.137
9.5	1.505	2.951	3.923	5.387	6.576	7.546	8.407
10.0	1.569	3.055	4.054	5.544	6.783	7.797	8.679
11.0	1.696	3.256	4.307	6.044	7.192	8.256	9.122
12.0	1.820	3.519	4.536	6.226	7.572	8.578	9.566
13.0	1.939	3.633	4.783	6.537	7.950	8.910	10.011
14.0	2.059	3.816	5.080	6.830	8.309	9.237	10.457
15.0	2.175	3.994	5.247	7.125	8.654	9.561	10.903
16.0	2.289	4.165	5.438	7.404	8.990	9.881	11.349
17.0	2.401	4.331	5.644	7.675	9.317	10.205	11.795
18.0	2.511	4.493	5.846	7.946	9.635	10.521	12.241
19.0	2.619	4.651	6.051	8.216	9.943	10.837	12.687
20.0	2.726	4.806	6.231	8.484	10.244	11.143	13.133
21.0	2.830	4.957	6.417	8.750	10.539	11.448	13.579
22.0	2.935	5.096	6.593	9.033	10.822	11.743	14.025
23.0	3.036	5.249	6.777	9.273	11.11	12.038	14.471
24.0	3.137	5.391	6.952	9.597	11.38	12.323	14.917
25.0	3.237	5.531	7.123	9.922	11.65	12.608	15.363
30.0	3.402	5.839	7.607	10.717	12.52	13.47	16.238
40.0	3.766	6.244	8.290	11.900	13.80	14.75	17.513

In this table, opposite the "hydraulic mean depth" as determined, in the column headed by the given fall per mile, will be found the velocity sought. Multiply the velocity so found by the area of the cross section of the stream for the discharge.

Ex. 102.—The side of a square flume of unplanned plank is 3 feet, the fall per mile 4.752 feet ($s=.0009$), and the coefficient of roughness of its bed, $n=.012$.

(See Table 26). What, per second, is the velocity, and what the discharge?

Cal.—In Table 28, find in "side" column for a square flume or canal, 3 feet; opposite which, in "area" column, is found 9 square feet, and opposite which, in hydraulic mean depth column, is found 1. Turning now to Table 27, computed for coefficient of rough-

TABLE 27.

Flow of Water per Second in Open Streams, the Coefficient of Roughness of whose bed is $n=.017$.

Hydraulic Mean Depth, $\frac{A}{P}$	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.	$F=2.64$, Velocity, Feet.
.25	.7893	.8463	.9092	1.072	1.172	1.260	1.361
.3	.9128	.9785	1.039	1.074	1.163	1.249	1.354
.4	1.143	1.200	1.263	1.375	1.463	1.549	1.644
.5	1.358	1.455	1.546	1.632	1.699	1.785	1.884
.6	1.558	1.718	1.773	1.872	1.932	2.064	2.228
.7	1.748	1.871	1.933	2.038	2.103	2.246	2.428
.8	1.928	2.044	2.104	2.214	2.284	2.430	2.619
.9	2.102	2.243	2.455	2.521	2.593	2.746	2.938
1.0	2.268	2.437	2.578	2.720	2.794	2.956	3.154
1.25	2.653	2.864	3.020	3.185	3.261	3.421	3.628
1.5	3.120	3.281	3.430	3.618	3.693	3.853	4.060
2.0	3.678	3.931	4.174	4.401	4.537	4.779	5.019
2.5	4.271	4.567	4.844	5.108	5.241	5.483	5.723
3.0	4.817	5.149	5.462	5.758	5.893	6.135	6.375
3.5	5.324	5.632	5.936	6.262	6.397	6.639	6.879
4.0	5.802	6.200	6.536	6.931	7.066	7.308	7.548
4.5	6.255	6.683	7.058	7.469	7.604	7.846	8.086
5.0	6.694	7.141	7.572	7.979	8.114	8.356	8.596
5.5	7.098	7.553	8.026	8.460	8.595	8.837	9.077
6.0	7.491	8.003	8.483	8.775	8.910	9.152	9.392
6.5	7.872	8.408	8.912	9.300	9.435	9.677	9.917
7.0	8.241	8.797	9.324	9.824	9.959	10.201	10.441
7.5	8.594	9.178	9.683	10.225	10.360	10.602	10.842
8.0	8.938	9.545	10.12	10.618	10.753	11.005	11.245
8.5	9.269	9.902	10.459	11.005	11.140	11.392	11.632
9.0	9.587	10.25	10.86	11.44	11.579	11.831	12.071
9.5	9.914	10.59	11.22	11.82	11.957	12.209	12.449
10.0	10.22	10.91	11.57	12.13	12.268	12.520	12.760
11.0	10.82	11.55	12.24	12.83	12.968	13.220	13.460
12.0	11.39	12.16	12.89	13.57	13.707	13.959	14.199
13.0	11.95	12.75	13.51	14.23	14.363	14.615	14.855
14.0	12.48	13.32	14.11	14.80	14.932	15.184	15.424
15.0	12.99	13.86	14.66	15.47	15.601	15.853	16.093
16.0	13.48	14.36	15.25	16.06	16.19	16.441	16.681
17.0	13.97	14.91	15.70	16.64	16.771	17.023	17.263
18.0	14.44	15.41	16.32	17.19	17.320	17.572	17.812
19.0	14.89	15.80	16.80	17.73	17.869	18.121	18.361
20.0	15.34	16.33	17.34	18.26	18.400	18.652	18.892
21.0	15.78	16.82	17.83	18.78	18.931	19.183	19.423
22.0	16.20	17.29	18.31	19.25	19.462	19.714	19.954
23.0	16.62	17.73	18.75	19.77	19.993	20.245	20.485
24.0	17.03	18.17	19.24	20.29	20.524	20.776	21.016
25.0	17.43	18.59	19.69	20.81	21.055	21.307	21.547

ness of bed, $n=.012$, find in hydraulic mean depth column 1.; opposite which, in velocity column, for the given fall $F=4.752$ ($s=.0009$), will be found the velocity sought, viz:

$$v=3.82 \text{ feet.}$$

Then $q=3.82 \times 9=3$

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BRIDGE WALL.—Joseph Eoright, San Jose. No. 337,941. Dated March 16, 1886. This patent covers improvements in the bridge-wall or fire arch of steam boiler furnaces. The invention consists of pipes supporting the fire arch and communicating at one end with the water space, and projecting outside with the furnace at the other end, each of said pipes having a separate and individual pipe connection with the boiler. It consists further in making the joints between the bridge-supporting pipes and their connecting pipes exterior to the furnace, and in a peculiar method of construction.

WATER-LEVEL INDICATOR.—Joseph R. Wilcox, S. F. No. 337,910. Dated March 16, 1886. The device is for indicating the level of water in a reservoir. It is a tube or pipe containing quicksilver. It is bent at its lower end and provided with an enlarged chamber, with the top of which the water main or pipe therefrom connects. At its other end is an enlarged chamber, with which a graduated glass tube of small diameter communicates, said enlarged chamber and graduated tube containing water. The object of the invention is to provide a means for accurately and conveniently indicating, in an apartment or place at a point much lower than a distant reservoir, the level of water in said reservoir, and to make the indications very plain or discernible.

EXERCISING MACHINES.—Bernard Farley, S. F. No. 337,942. Dated March 16, 1886. This belongs to the class of exercising machines for gymnastics or private use in which weights are alternately raised and lowered for the purpose of developing the muscles. The invention consists of an outer casing, a vertically adjustable frame in the casing, and a peculiar arrangement of purchase-ropes passing over suitable pulleys on the frame, and adapted to raise and lower sliding weights, said ropes being provided with handles by which they are operated. It consists further in a novel mechanism by which a record is made of the work performed on an adjustable hackrest, adapting the machine to be used for exercising a pushing force and in a novel arrangement of guide-pulleys by which the ropes can be continued and guided to adapt the machine for use with the sliding seat of a rowing frame. The object of the invention is to provide a machine which can be used to exercise the pulling muscles, the pushing muscles, and those muscles which are called into action in rowing.

THE ANNUAL STATISTICIAN.—L. P. McCarty has issued his "Annual Statistician" for 1886. This work may be considered standard and gradually increases in size and value each year. The new matter and corrections of the present volume have been obtained by direct correspondence all over the world, and exceed both in quantity and variety (not to mention correctness) any previous edition. The "Statistician" for 1886 contains 648 pages (the largest yet issued), over 125 of which are entirely new, and over 500 so corrected that they become new. Many new features have been added in this edition, not least of which are its illustrations, four in number, two of which, viz., "The Flags of All Nations," and "The High Domes, Columns and Spires of the World," are colored plates. A cut of the Washington Monument occupies a whole page, including complete statistics regarding the same. The fourth illustration is a full-page cut of the Hon. Leland Stanford, U. S. Senator from California, followed by five pages regarding his unprecedented gift of over \$5,000,000 worth of property endowing a university in this State. The present is the tenth annual edition, and although many pages have been set aside from the previous edition, to give place for new matter, the present volume is much larger and contains an aggregate of over 200,000 facts, of which at least \$50,000 are mathematical (consisting of over 2,000,000 figures). Under the head of "This and That," over 100 subjects are treated in bulk, and including the inventions, discoveries, organizations, public schools of the U. S., chronology of important events down to Jan. 13, 1886, etc. As the name implies, the book is one of reference, and is useful in every library.

Steps have been taken to develop more actively the supply of petroleum that lies in the subterranean basin across Los Angeles county from west to east. A portion of La Brea rancho has been leased by Messrs. Stewart, McDonald, Irving and others, for the purpose of boring for oil, and the lumber and machinery are already on the ground for that object. Operations will commence at once, with fine prospects of success. By the lease these gentlemen can have on 500 acres of La Brea. In Petrolia, 25 miles east of the city, active work is going forward in sinking wells, under the direction of Mr. Burdett Chandler. Two wells there are producing oil at present, and more will soon be added to these. The Puente wells are turning out oil abundantly.

The oldest frame house in Oregon was built in 1842, and still stands as a monument to the skill and industry of the pioneers of that State.

USEFUL INFORMATION.

SCHMITT'S RUBBER OIL FOR LEATHER.—A compound composed of gutta percha, cotton seed oil, and codfish oil in combination with cocconut, pomogranate rind and an aromatic, has been patented by Adam Schmitt, of New Orleans, La. The method of preparation is peculiar but inexpensive, and the resultant compound is used to oil leather to render it smooth, impermeable and elastic. The compound has no disagreeable smell, which is a common objection to many similar preparations. Its special qualities make it the very best oil for boots, shoes and harness, and all kinds of leather goods requiring oil. Leather treated with this compound at once becomes soft, pliable and water-proof, will not turn red, and increases the heat non-conducting qualities, making it especially adapted for boots and shoes. Vermin will not eat leather that is filled with it, which is a quality of great value to dealers and manufacturers of leather goods. The compound has been highly recommended wherever introduced, and is warranted to satisfy the most critical. We would give in this connection what is said to be an excellent recipe for a preparation for a harness cleaner and oiler. Take two ounces mutton suet, six ounces beeswax, six ounces powdered sugar candy, two ounces soft soap, and one ounce indigo or lampblack. Dissolve the soap in one-fourth pint of water, then add the other ingredients, melt and mix together; add a gill of turpentine, lay it on the harness with a sponge and polish off with a brush.

"BURNING ON STUFF."—Burning on stuff is a new, just as amusing as repaying, work, and is done in much the same manner as burning on wood. Short napped goods, such as cloth, especially velvet, are the best suited for the purpose. These burnt patterns have an original effect and can be made useful for a variety of things for ornamental cushions, covers, chairs, etc. At first the pattern is marked on the material and a small apparatus is used. It consists of a bottle filled with benzine and provided with an India-rubber tube. A hook enables the worker to fasten the bottle to the belt of the dress. The lower part of the tube is held in the left hand, while the upper part, ending with a platinum-pointed pencil, is taken in the right. Pressure on the ball forces the benzine into the pencil, which is heated by a spirit lamp or candle previous to going over the marked-out pattern with it. One must be very careful to try whether the point is not too hot. By more or less heavily pressing with the same a great variety of effect can be produced—sometimes a deep, dark furrow, sometimes a faint line, according to what design requires. By a skillful manipulation of the surface of the stuff near the outlines the drawing can be shaded lighter or darker, and the work made into a charming production.

ASBESTOS PLASTER.—Efforts have been made for several years to produce a fire-proof plaster for buildings. As heretofore used, the wooden lathing has rendered ordinary plastering objectionable. Metallic laths, even, do not seem to answer such a desirable substitute as to fill all conditions. A plaster has of late been made of asbestos, silicate of soda and potash, and without lime or hair, that answers very well. The chemical action of the ingredients forms a hard, stone-like substance, having great cohesive and adhesive qualities. So great is the latter quality that the plaster requires no key or hair to hold it firmly in place, even on the smoothest surface and in building. When it is put on iron surfaces, the plaster being an alkali, it has a tendency to produce rust. The adhesive quality of the plaster is such that it will stick so firmly to a plain surface as to require the use of a chisel to separate it from the metal. This plastering can be laid in the coldest weather. If this new material is all that its friends claim it to be, it is certainly something very valuable.

CAUSE OF SAN FRANCISCO FOOGS.—Prof. Davidson says that the water at the Golden Gate entrance of San Francisco harbor, from a mean of ten years' observation, shows a lowest temperature for the month of January of 50° 49' F., and the highest for the month of September, 59° 68' F. The average range is thus only nine degrees, and the extreme range has only been 13 degrees. The temperature of the air follows closely that of the water, and it is the uniformity of the latter's temperature along the Pacific Coast, and its coldness, which conspire with the northwest winds of summer to cause the peculiar foggy conditions which prevail.

A HUNDRED-YEAR OLD STEAM ENGINE.—A "Sun-and-Planet" engine, designed by James Watt, has still a place in the famous brewery of Messrs. Whitbread & Co., and is still performing the duty for which it was constructed in 1785. The *City Press*, London, says: "Though there have been alterations to increase its power, all the principal parts remain as they were originally manufactured. A metal tablet affixed to the engine gives an account of its invention and history."

AN IMMENSE POSSIBLE SAVING.—It cost about \$7,000,000 to harvest the cotton crop of 1884-5, but it is asserted by the company which is introducing the new harvesters invented by

Owen T. Bugg that the work could have been done for \$7,000,000 by their machines. If \$50,000,000 are to be saved in gathering the crop, it would have some effect on prices.

THE GREATEST LUMBER MARKET IN THE WORLD.—Chicago is not only the greatest lumber market in the West, but also in the world. In 1847 the lumber receipts at this port amounted to a little over 32,000,000 feet. In 1850 they rose to considerably over 100,000,000 feet; in 1860 to over 262,000,000 feet; in 1870 to over 1,019,000,000 feet; in 1880 to over 1,564,000,000 feet, and in 1882 to over 2,116,000,000 feet. At this time a notable decline commenced, from which that market has not yet recovered. In 1883 the Chicago receipts fell off to 1,339,000,000 feet; in 1884 they dropped to 1,802,000,000 feet, and in 1885 only 1,700,000,000 feet were received there.

SILK SPINNING AND WEAVING.—There are about 100 mills in Philadelphia engaged in spinning and weaving silk, while there are four at Darby, a suburb. Flushes and velvets have recently been added to the products. About 8000 persons are employed on these industries in Philadelphia.

THE JAPAN PATENT SYSTEM.—A patent system was adopted in Japan last July, and now the number issued averages about two per day. They are mainly for agricultural implements, and are confined to residents of Japan entirely. Everything can be patented except medicines, which are ruled out.

PETROLEUM FUEL ON AN OCEAN STEAMER.—English journals record the late voyage of a large steamer owned in London which has been fitted to burn petroleum. Good time was made and general satisfaction is expressed with the experiment.

A CHEMICAL study of matter dredged by the Travailleur and Talisman expeditions has enabled M. Dieulefait to say that copper and zinc were universally detected in deposits obtained at great depths and in regions of the ocean widely remote from each other.

GOOD HEALTH.

Something About Bathing.

EDITORS PRESS:—As the bathing season approaches it may not be amiss to say a word on the good and ill effects of the bath. From the personal experience and observation of the writer, he must give it as his opinion that bathing, as a general thing, is injurious rather than beneficial to the human race. The avowal of such a belief in the outset of this communication will, no doubt, cause a howl of dissent from the thousands of refined readers of SCIENTIFIC PRESS. They, no doubt, entertain the same opinion as that of the proprietor of a "water cure," who, when asked what had the most refining influence on the human race replied, "soap."

Although cleanliness is refining and filthiness is degenerative, still, those who make the greatest pretensions to refinement and who take the greatest pride in the purity and softness of the skin, seldom indulge in the use of that over-estimated luxury, soap. There can be nothing more injurious to the skin than the unneutralized alkali which most soap contains, and it must be a filthy person, indeed, which cannot be made clean by the application of warm water and a towel. The stale odor of soap is not a pleasant thing to carry about the body, so anyone must know who ever took a sniff when passing the door of a Chinese laundry.

So much for soap; now does not the alkali of "hard water" have the same deleterious effect upon the skin? Compare the texture of the skin on the exposed surface of the body and that which is protected from the effects of the elements by clothing, and mark the difference. The difference is, not entirely caused by the effects of the sun and air, but chiefly by the water which is applied so often to the face, hands and neck.

There are many who can bathe with impunity even in the icy water of the bay of San Francisco, but they are such as have hides as tough as a seal, and who can eat as much as one, too. They are such as neither cold water nor dirt will have an ill effect upon. They are as much at home in the water as a fish and they can stand as much cold as a walrus. But persons who bathe most are those of weak, broken-down constitutions. They don't always bathe for the pleasure of bathing, but for the good effects to be derived from it. They take baths as they do medicine, through the advice of some well-wishing friend who has not learned the first principles of hygiene. They bathe because they think it will be the means of removing the foul matter discharged from the pores, not knowing that the corruption is in the blood and that all the water of the Pacific would not wash it out.

The effect of bathing is often the direct reverse of what is intended; for instead of the water having the effect of opening the pores it is the means of contracting the skin and closing them. As well might a person expect to make a tight boat comfortable by immersing it in cold water. But the advocates of bathing

will say, "Prudence should be used by the invalid when he takes a bath. The water should be of the proper temperature, and he should be rubbed and put to bed on leaving the bath." But where can the prudent invalid be found. Their imprudence is often shown by them in the highest degree in the manner of taking a bath. Where is the invalid who would submit to be blanketed and put to bed when under the delightful exhilaration derived from a bath? Like one under the influence of a moderate dram, he feels too happy then to go to bed. If ever he feels like enjoying life it is then. It is then he "seeks the graceful dance, the tennis some, and some the manly toils of" slopping.

But like the person under any kind of stimulant, how weak and inefficient he when the reaction comes. How much lower than he would have been had he not been stimulated at all. Will the machine last longer when it is run at its greatest capacity, or will it accomplish more in its whole existence? By no means; but generally speaking, a great deal less.

If the bathers leave the bath-tub or the surf, and go on in his usual habits of labor or pleasure, and if, after the expiration of a few hours, he should feel as well or better than he did before taking the bath, then the writer will admit that the lessons he has learned from his own experience and that of others have misled him. Let the bather leave a hot bath and remain in an atmosphere many degrees lower than that of the water, and if he has not an attack of catarrh, croup or congestion of the lungs the next day, he should congratulate himself upon being a person of great physical endurance.

The greatest desideratum to insure perfect health is an even, regular and temperate life, and he who fights against nature, either through ignorance or a desire to live faster for a few unprofitable moments will, sooner or later, suffer the painful effects of it.

A. S. YOUNG.

Ignorance Regarding Hydrophobia.

There is probably more ignorance abroad in the land relative to hydrophobia, says the *Kansas City Journal*, than almost any other disease that man or beast is heir to. It is quite safe to say that on an average of fifty dogs killed as rabid not more than one has the real rabies or hydrophobia. Most of the dogs killed as mad are simply afflicted with fits. A dog is seen running around aimlessly, snapping its jaws, from which foam is exuding, and immediately the cry of "Mad dog" is raised, and the animal is killed. Should any one be hitten visions of a horrible death from hydrophobia are conjured up, and for weeks and months the victim lives in a constant torture of fear.

Now dogs are subject to fits, especially in certain stages of distemper, and from other causes, and the symptoms of the disease are as above stated. Dogs never become mad suddenly. The disease progresses slowly, and the symptoms are readily discernible to one posted. The dog shows a great fear of light, hiding away in dark places, and comes out very reluctantly, and only at the stern commands of his master. It develops an abnormal appetite, eating hoards, and even pieces of old sheet-iron, tin, etc. It shows great nervousness, starting suddenly in apparent great fear of something. Its coat becomes dull and rough.

Finally, it shows a great horror for water, and then begins to wander around, snapping at objects aimlessly. It seldom moves with much speed. Its head is generally held low, its tail carried well between its legs and its hack arched. One who has seen a real mad dog will never confound it with the one charging around with fits. When three or four of the above symptoms develop themselves it is the part of prudence to kill the dog.

HOW TO GET STRONG.—One of the secrets of muscular recuperation is in stopping when fatigue begins from exercise. He or she who is not fresher in body and mind for the exercise taken, has had an overdose of what in proper measure would have proved a benefit. The gain in strength is shown and felt in the increasing ability to do more and more without exhaustion. The measure of success is not in the greatness of the feat accomplished, but in the ease with which the exercise is indulged in, and in the absence of exhaustion after it. There are occasions frequent enough in which people in the struggle of life are forced beyond their powers of endurance, and there is no need to carry into the pursuit of recreation the fatigue which exacting work imposes. For beginners this is important; after a time one can take more exercise and feel no fatigue.—*Herald of Health.*

HOW WE SPOIL OUR LUNGS.—Houses are always filled with more or less dust. During the winter, when the ventilation is imperfect, this is especially the case. The stove is a most common cause, as its heat dries up every bit of dirt in the room, and it is wafted about by currents of air, and stirred up by the skirts of women. Women probably do not know how much dust their skirts send into the air whenever they sweep over the carpet. It is invisible to the eye, except when the light of the sun shines on it. All this is breathed, and helps to spoil our lungs. Is there any help for it? At least one, and that is ventilation. Frequent and thorough ventilation, especially when the rooms are swept and dusted, while it does not remedy the evil, makes it less.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MOORE.—Amador Ledger, March 27: The work of sinking the shaft 100 feet deeper was commenced this week. This will carry the shaft to a total depth of over 400 feet. If at this depth the ledge, which is over 20 feet wide in the level now being worked, holds its own in size and quality, a 40-stamp mill will be erected. It will take six weeks to complete the sinking operations and the mill will be kept running during the time if possible, although it is considered doubtful if it can be done with the single-compartment shaft. From present indications the prospects are in every way flattering for the development of a great mine. The ore now being milled bears the general characteristics of the Zeile rock, and is, no doubt, a portion of the same ledge.

SUTTER CREEK.—Operations at the Mahoney mine are still in abeyance. E. Harrington has gone below for a few days, and in all probability the pump and skips will be put in operation as soon after his return as possible. The intention is to start up about the first of next month. At the Lincoln everything is running with clockwork regularity. The mill is kept going to its full capacity with plenty of pay ground in sight to operate upon. Mr. Stewart is taking the whole hill to the depth of 20 feet, and below this there is said to be pay ground that will no doubt be crushed when the superficial crust is disposed of. Drifting at the Eureka is still the order of the day. The drift has reached within 400 feet of the old works, and every precaution will be taken to prevent accident from the immense body of water contained in the old mine. The Iowa mill was started again a few days ago and will run for about a week more before a cleanup is made.

SAN JOAQUIN.—Operations at this mine at Pine Grove, formerly known as the Tellurium, were brought to a standstill last Saturday. A quantity of ore was taken out and the mill was kept running for several days. It was found on cleaning up that the rock would not pay expenses, and as soon as this was ascertained the owners ordered the mine closed. From \$10,000 to \$12,000 have been expended in this last venture on expensive hoisting and pumping machinery.

Alameda.

STRUCK THE COAL.—Livermore Herald, Mar. 25: Jenkins Richards has struck the coal vein in his long tunnel, 300 feet from the surface. Three men have been at work, in eight-hour shifts, night and day for over two months. He will now run in lateral drifts, open up a stope, and begin taking out coal sometime in May. Several thousand tons can be taken out without the use of an engine or hoisting apparatus. The vein struck is nearly five feet in width and the coal is about the best in the district.

El Dorado.

LONE JACK.—Cor. Georgetown Gazette, March 27: Rudolph Orth and Henry Anderson, prominent mining men of San Francisco, have purchased the Lone Jack mine situated one mile north of Johnstown, of Julius Johnson and John Hanley. The amount paid was \$10,000. The present owners will erect hoisting works and a ten stamp mill immediately. This mine has shown good prospects, and no doubt it will prove a valuable property to its owners. The same gentlemen have bonded the Bacchi mine, of which a short mention was made last week. Your correspondent having visited the mine, found Messrs. Orth and Anderson busy with rock which had been taken from the entire width of the ledge, and the gold that showed up was all that could be desired. Work will be commenced immediately. They propose sinking a shaft sufficiently deep to ascertain if the ledge is permanent. A tunnel will be run in at the foot of the hill 200 feet and tap the shaft 150 feet below the surface. This is only a small beginning of what is to be done in the near future in the way of mining. Your correspondent visited the Esperanza mine on Saturday last. Work is being pushed right along by Supt. Burlingham. This mine bids fair to be one of the most valuable in the county.

CLEAN-UP.—Placerville Observer, March 27: Armstrong & Robert, at Henry's Diggings, have just cleaned up their drift claim, washing 400 wheelbarrow loads, realizing a little over thirty ounces of gold, most of which was coarse, nuggets going as high as two ounces. They started a new tunnel last Monday to tap the old works at greater depth. This tunnel will be run about 200 feet before the old works can be reached, when they expect to find even better gravel than that just cleaned up. These gentlemen richly deserve their prosperity.

THE INDEPENDENCE MINE.—In Consummes township, is showing a ledge 4½ feet wide of ore that is estimated by mining men at fully \$30 per ton. Supt. Russell intended starting the mill up yesterday, and calculates to work 15 tons of ore per day. This will bring into existence for the use of mankind the nice little sum of \$450 per day. E. R. Morey was down from Grizzly Flat last Wednesday, accompanied by Stephen Jeffrey. Mr. Morey was making a transfer of his Charles mine to Supt. Finley, representing the Mount Pleasant Mining Company, for a consideration of \$5,000. The Charles is located just north of the Mount Pleasant mine, and when worked seven years ago produced \$7,300 in one week. This mine will be worked in connection with the Mount Pleasant, and will be at least thoroughly prospected. The Bradley ditch, taking water to Henry's Diggings, in Consummes township, is in a bad state of repair, and the miners are suffering for water.

Inyo.

AN OLD MINE RESURRECTED.—Inyo Independent, Mar. 27: Twenty years ago there was a mining excitement at Chrysopolis ten miles north of Independence station. Some rich gold rock was found, a mill was built and a good deal of work was done in mining. Those were times of inflated ideas, miners expected to make fortunes in a few weeks, or months at farthest, and unless they got large gains immediately their claims were abandoned. Rock that would not pay at least one hundred and fifty dollars a ton was regarded as worthless. These were the ideas of the men who opened the Oro Fino mine at

Chrysopolis; they were disappointed by not making fortunes at once, got disgusted and quit and the mine was abandoned. Some time ago the property came into possession of Harris & Rhine of Independence. About three weeks ago an arrangement was made with two miners named Wilcox and Manton, by which they were to reopen the mine and prospect it. Very liberal terms and all necessary financial aid was given them, and already they have opened up what has every appearance of being a large and valuable ore body. The ledge is full six feet wide, and at least twelve inches of this is quite high grade ore. More men have been put to work in the mine, which has been re-named the "Hope"; ore is being got out rapidly and the Maxim mill will be set to work upon it soon.

Mariposa.

A RICH FIND.—Mariposa Herald, March 26: The people of Mariposa managed to get up a little excitement last Saturday, for the first time in a good many moons, when M. M. Rumley brought to town \$6,000 in gold, the result of one day's work on his claim near Saxton creek. Eleven months ago Mr. Rumley closed his saddle and harness shop in Mariposa and went out to work on the tale lead. He worked several months there and the result not being satisfactory, he concluded to prospect the hill just back of the Buena Vista mill. He commenced work with a pick and pan. At the bottom of the hill and prospected up, and at the place where he found the coarsest gold he began to sink. Last Friday at a depth of six feet he found the pocket and at noon commenced taking out the gold. By Saturday noon he had \$6,000. He came into town that afternoon and remained until Monday, when he went back to see how much more he could find. Up to the Monday preceding the strike Mr. Rumley had worked 10 months and 3 weeks and had made but \$30. He is a sober, steady, industrious man, and is well calculated to stand prosperity. It will be no surprise if he takes out a million in the next few days, for the country out there is full of the precious metal. Later—Since going to press Mr. Rumley brought in 16 pounds of quartz and gold estimated to be worth \$3,000. Intense excitement prevails in Mariposa, and the town will be deserted to-day, as everybody is rushing to the new El Dorado.

Nevada.

THE CROWN POINT.—Grass Valley Union, Mar. 24: The work of cleaning out the shaft to the 300 level of the Crown Point mine is nearly completed, there being but about 10 feet more of debris to remove when drifts will be started both ways from the shaft. Work on the new reservoir, which is to supply the mine with water at a much greater pressure than is obtainable at present, is progressing favorably, and in about a week more all will be in readiness. The ledge in the 180 stope is looking as well as ever and holds its full width. Some very fine specimens were taken from this stope yesterday, they showing plenty of free gold and heavy sulphurets and galena. Another ledge has been encountered in the easterly drift, which runs to the foot wall, and lays very flat. The rock from the new ledge is entirely different from anything yet found in the mine, and in the course of time it will be prospected. Everything about the Crown Point is very encouraging.

THE BADGER.—The work of grading and timbering a portion of the old shaft at the Badger mine is progressing finely, and if the present good weather holds out the machinery will be ready to start up in about a month. In a short time the machinery from the old Washington mine will be laid down on the Badger ground. The tunnel from the Idaho ditch which is to supply the Badger with water power, is being driven with all possible speed. From one approach the tunnel is in 80 feet and from the other end about 50 feet, and the ground is not hard to work. It is thought the tunnel will be ready to turn water through as soon as the hoisting works are in place and the machinery ready to move.

Placer.

THE MEDA MINE.—Argus, March 25: The Meda mine, a mile and a half southeast of New England Mills, is now under the experienced management of Messrs. Smith & Hersey, who have the mine under bond for a year. A late partial cleanup after twenty days' work, much of which was dead work, yielded some \$450—not very much, but enough to give encouragement to the enterprising operators above named. Previous to December last the mine had lain idle for some years. The hoisting-works and the mill (a five stamp one) are run by steam. The mine comprises, among other improvements, an inclined shaft of 87 feet, and two tunnels, each 180 feet long one of which is down 30 feet, other 67 feet. A third tunnel is connected by means of a track and trestle with the top of the mill. By its means a great deal of otherwise unprofitable work is avoided, and the cost of taking out the ore is reduced to the minimum, something less than two dollars per ton.

Plumas.

GOOD PROSPECTS.—Cor. Mt. Messenger, March 27: The prospects in this county were never better than at this time. A prospect tunnel has been running for some time under the direction of John H. Thomas, into a mountain near Onino valley, where many old miners said it would be a failure. A short time since they struck through into one of the richest beds of gravel that has ever been opened anywhere in this section of country, paying from \$10 to \$25 per carload.

San Bernardino.

CALICO.—Print, March 28: The Lander Bros. have struck it rich on their claim in East Calico. The boys are about to be richly rewarded for their labor. On the Blackfoot mine ten chlorides are mining with good results. A large amount of money has been taken out of this well-known claim and the prospects are thousands more will be its yield.

San Diego.

STONEWALL.—Los Angeles Times, March 26: A gentleman just in from the Stonewall mine at Julian, San Diego county, has left on exhibition at this office a sample of quartz from this famous mine which fairly glistens with free gold. This mine, as is known by most readers of the Times, is owned by Dr. J. E. Fulton and Alfred James, of Los Angeles. The rock is running \$30 to the ton at present, and the output amounts to \$600 a day. It is a bonanza.

Shasta.

MILL.—Shasta Co. Democrat, March 25: The owners of the Clipper mine on Squaw creek are figuring on putting up a mill on the mine. Hopping & Bell expect to have their mill in operation on the

Central in Old Diggings district next Monday. O. P. Whitton has sold his quarter interest in the Croesus mine on Squaw creek to Billy Edwards of Red Bluff. Last week, while sinking a new shaft on the tellurium mine on Salt creek Mr. Scheerer struck more tellurium ore. The placer miners of Buckeye district are preparing to clean up, and all expect good returns for their winter's work. Mr. De Forest intends to increase the facilities of his assay office by adding two more furnaces and building on an addition to his establishment. Reid & Co., for the past two months have been running a new tunnel on their mine on Star gulch, and last Saturday struck the vein. It is three feet in width and the ore prospects splendidly. The proprietors are highly elated. Jim Brincard and his brother-in-law, Lowery, last week struck a fine gold prospect near Copley. The vein is about five feet in width and is capped with iron gossan which prospects splendidly in free gold. They have made two locations. Fred Meyers, the Red Bluff teamster, who had such good success hauling in the machinery for the Croesus mine, has been awarded the contract to haul in the machinery for Matthews & Co., and is now at work on the job. Fred is a rustler and knows how to tackle such work. Andy Fife is moving his Huntington mill and ore concentrator from Lower Springs over to Potter's mine on Spring creek near the old Stump ranch. There are about 200 tons of this ore to start on. The machinery will be propelled by water power, and he expects to have it in operation by the middle of next week. Representatives of a San Francisco company are negotiating for the Mammoth mine in Old Diggings district. We learned yesterday from an interested party that the purchase price was agreed upon, but the sale was pending on the amount of money paid down. The sale is thought to be as good as made, however. It is thought that another roasting furnace will have to be added to the Iron Mountain mill before the ore can be successfully treated. O. Earl, president of the company, came up the latter part of last week to confer with the superintendent about the matter. Mr. Earl thinks it will take two months yet to get everything working properly and find out what is needed.

GO.—Shasta Courier, March 27: Our mining interests are looking up considerable. The arastras on South Fork have been running on good ore all winter, and gives satisfaction to the owners thereof. Capt. G. H. Atkins is now in San Francisco purchasing a mill to crush the ore from Cooper & Robinson's mine, in which he is part owner. The Hard Scramble mine has just made a good cleanup, and is now in running order again. There are also considerable placer mines being worked near Igo.

BROWN BEAR MINE.—The 10-stamp mill here is kept constantly running day and night, and between thirty and forty men are employed. The demand for labor over here, and all along from French Gulch, at present, appears to be pretty well supplied, and none but skilled workmen in all grades of employment meet with much encouragement.

CLEANUP.—The lessees of part of the Washington mine cleaned up from twenty-seven tons of ore which yielded ninety-seven ounces of gold; that, at \$16 per ounce, gives \$1,552—\$57.40 the ton.

Siskiyou.

QUARTZ EXCITEMENT.—Yreka Union, March 26: The south fork of Mill creek, five miles from Scott Bar, is the seat of the latest quartz excitement. The richness of the placer mines in that section indicate that good quartz lodes exist and the new discoveries are likely to prove bonanzas. Eastlick brothers at Oro Fino have run their new elevator for the past seventy days and will have water forty or fifty days longer. They have reason to expect a large cleanup, having stripped considerable bedrock.

Trinity.

THE RICHEST.—Journal, March 27: Fred. H. Loring, of Calhoun Ranch, Siskiyou county, spent a couple of days in town this week. He carries a gold specimen from the Grover Cleveland mine, in New River district, which is the best ever taken from quartz in this county. It weighs about \$25 and is nearly all gold. Mr. Loring will visit Deadwood and French Gulch district to inspect the mills in operation there with a view to getting a suitable crusher for the Grover Cleveland mine. He has abundant faith in the quartz mines of New River district.

THE LAST CHANCE.—Unless more rain comes soon, the hydraulic mining season will be brought to a close at an unprecedented early date. In 1879 there was 8.28 inches of rain fell during the month of April, and it is hoped the same month of the present year will be equally as moist.

FAVORABLE REPORT.—The Oregon Gulch Mountain mine, under the superintendency of O. M. Loveridge, will make an excellent showing this season; the ground now being worked prospects splendidly.

DOING GOOD WORK.—Supt. Benjamin, of the Hayes Red Hill gold mines, informs us that everything in and about the mines is running in splendid order and good work is being done.

Tuolumne.

STRIKE.—Tuolumne Independent, March 27: A rich strike has been made in the Harriman & Keil quartz claim, one mile north of Sonora, above the French Garden, near the Phoenix ditch. This was formerly known as the "old Mexican claim," and latterly as the Keyser mine. The owners, Messrs. H. & K., have leased the mine to four Austrians, the lease expires in May. It is an expensive claim to work, requiring to be timbered every inch of the way. The strike was made about three weeks ago, ninety feet below the surface, and is still paying largely to date. Rumor has it that \$300 was washed out of one pan of dirt and quartz, and that a gold brick has been seen containing eight pounds, valued at \$2,000. Prof. Shraft and Thos. Bluet, owners of the Annie mine, beyond Columbia, struck a nice pocket last week, which yielded \$200, with probably more to come. They have had several good finds before, and we hope they will find many more, and bigger ones, in the future.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Virginia Enterprise, March 27: The upraise from the 3000 level has nearly reached the 2900, and the connection will be made to-day. This is a very important connection, not only for air circulation purposes, but in the development of the body of good ore passed through

by the upraise. The main object has been to carry this upraise winze through to the 2900, therefore there has been no side stoping, but the upraise has been in ore all the way, some of which is of a rich character and the whole will give good milling returns. The upraise from the 3000 level is showing splendidly, developing a body of fine ore in which gold predominates, 20 feet in width and evidently much wider. The ore from these lower level from the old Mexican shaft, have made their usual progress, showing no improvement since last week's regular report. Both are crosscutting the vein, and showing only low-grade ore thus far. On the 2500 level of this mine, south of the shaft, a vein of very good ore was developed some 20 years ago about 10 feet wide. It was rich, but there was so much base metal, lead, antimony, etc., in it that it did not pay for extraction and reduction. By roasting, however, with the present improvements and appliances, it could be made to pay very well, especially if a concentrator were brought into practical application in the matter.

HOLLAR.—As remarked last week, no crosscutting is being indulged in as yet on the 3000 level, and no orders received to resume sinking the Combination shaft. In fact, sinking this shaft deeper at present would interfere with the exploration of the 3000 level, including the advancement into the Potosi ground, which is being conducted through the Chollar. Supt. Hamilton will return from San Francisco in a day or two, when something definite will probably be known and demonstrated as to future propositions and operations.

CON. CALIFORNIA AND VIRGINIA.—Everything working finely, with the ore production fully up to the standard—over 400 tons per day. Average assays from the mill batteries, about \$73 per ton. The drift running northwest on the 1400 level is now in 446 feet, 63 feet having been added during the week. On the 1650 level a crosscut has been started west from the main northwest drift to get into the old bonanza ore stopes and workings at a more eligible point farther south.

BEST AND BELCHER.—The pumps are still holding the water at the 2128 station. The drift north on this level is the only connection with the C. and C. shaft and the north-end mines. A heavy bulkhead placed in this drift to shut off the water flowing from that direction is being strengthened, and as the level is getting pretty well drained, the donkey pumps will be started up to-morrow to drain the shaft to a greater depth.

POTOSI.—The main lateral drift southward, or rather southeast, is being shoved ahead at the rate of 11 feet per day, and is now 150 feet into Potosi ground from the Chollar south line. Material, vein porphyry, dry and favorable, no water interfering. Seven hundred feet is the lateral extent of the Potosi and the Chollar respectively.

MEXICAN.—On the 1500 level, west crosscut No. 2 is in 250 feet. The east crosscut on the same level is in 72 feet. Material at both points, principally vein porphyry. On the 700 level the joint Union and Mexican drift running northwest from the Ophir shaft is in 140 feet, 39 feet having been added during the week.

GOULD AND CURRY.—On the 600 level the old southwest drift has been cleared out and retimbered 34 feet during the week, making a total length of 320 feet from the main west drift. It is expected to be reopened through to the Savage north line in about two weeks.

CROWN POINT AND BELCHER.—The daily output of ore from these two mines is about 375 tons. The old ore stopes of the upper levels hold out well, and some pretty good ore comes from the 1600 and 1700 levels.

UNION CON.—On the 500 level north lateral drift No. 2 has been advanced 37 feet, making a total extent of 290 feet. Material, wet vein porphyry, with streaks of clay and decomposed quartz.

OVERMAN.—About 50 tons per day of low-grade ore are being extracted from this mine, through the old Petaluma street tunnel. It is all from the upper workings above the 250 level.

MONTE CRISTO.—No ore is being extracted at present, but drifts west are being run on the 50 and 150 levels from the main shaft. The rock is very hard, consequently slow progress is made.

SIERRA NEVADA.—West crosscut No. 2 on the 520 level was advanced 38 feet during the week, making a total length of 268 feet. Material, vein porphyry, with streaks of clay and quartz.

YELLOW JACKET.—The regular daily yield of about 130 tons continues from the old upper workings above the 1300 level, keeping the Brunswick mill steadily supplied.

KENTUCK.—The old upper workings continue their daily output of about 45 tons per day, supplying the Rock Point mill.

ALTA.—On the 700 level the main lateral drift north has nearly reached the south line of the Benton ground. Material, dry vein porphyry.

JUSTICE.—Work is going ahead, developing the low-grade resources on the 350 level, at the south end of the mine.

Bell District.

SUSPENDED.—Belmont Courier, March 20: Work has been temporarily suspended in the mines of Bell district.

Belmont District.

CHICAGO.—Belmont Courier, Mar. 20: Supt. D. H. Jackson, of the Chicago Mining and Reduction company, Ophir Canyon, is in San Francisco for the purpose of purchasing an air compressor and Burleigh drills for the faster prosecution of work in the mine. The mill continues to run steadily turning out its usual quantity of the white metal, and the ore reserves in the mine are looking as healthy as ever. This mine has a big history in front of it—dividends in embryo.

Columbus District.

IMPROVEMENTS AT THE MILL.—True Fissure, March 26: J. B. White & Co. have completed the retort house and assay office at the new mill and have built a platform from the ore-receiving room to the bank in the rear of the mill. The mill company is now building an ore chute 100 feet long and is completing a water tank with a capacity of 20,000 gallons.

HOLMES.—We are still working in the McCuen ledge, near the old seventh level. The ledge is small, but looks better than at last report. The ore is good and the ledge looks well. The stope 60 feet

deposits, removed in the explorations, has been and is being deposited in the main drifts preparatory to the time when the proper hoisting facilities can be given at the Combination shaft. When this can be done it will be a mere matter of raising the ore, milling it and shipping the resultant bricks to San Francisco.

OHIO.—The drifts on the 300 and 400 levels, below the Morris looks the same. The ledge is very large and is producing good milling ore. The whole ledge in this stope goes to the mills. In the eighth level we are stopping in the Morris ledge. This stope is 170 feet long, will average $\frac{1}{4}$ foot wide and the ore is good milling. The new ore body in this stope runs off into the hanging-wall of the main stope at a point about 90 feet west of the east end of the main stope. This ore body runs in a north-westerly direction from the main stope. It will average $\frac{1}{4}$ foot wide. It is a parallel ore body to the main eighth. The gypsum ore body still looks well. We are taking out a large amount of ore from this stope.

MR. DIABLO.—The stope above the west drift on the 4th level shows a foot of 600 ore. In the intermediate between the third and fourth levels we are taking out a little ore of fair grade. The stope above the west drift on the third level is giving some ore of good grade. The stope above the east drift on the second level shows several streaks of 600 to 1000 ore that looks promising. From the west drift on the second level we are taking some rich ore from small streaks. The west drift between the first and second levels is in 49 feet and the face shows 3 feet of 600 ore.

Esmeralda District.

AURORA.—Walker Lake *Bulletin*, March 25: The station on the 200 foot level of the Humboldt Hill mine in Aurora was cut out on Monday. It is expected that the 300 foot level will be reached by the fifteenth of next month. Everything in the old camp looks encouraging and there is no doubt that the company now at work will meet with abundant success in the enterprise.

Eureka District.

PROSPECTS OF THE CAMP.—Eureka *Sentinel*, March 25: Eureka is certainly passing through a very quiet period, but there are unmistakable evidences of a prosperous era dawning shortly on the mining situation of the district. We do not say this way in order to show a "stiff upper lip" or to inspire unwarranted expectations. This feeling of hopefulness is shared by all of our people who are in any way posted on what is going on in connection with the mining properties of the district. That a compromise of the differences existing between the Albion and Richmond Co.'s will shortly be consummated is highly probable. Such an understanding would no doubt result in the Richmond Co. entering into full ownership of the Albion mining ground, which embraces five or six original claims. This in connection with the large area of ground now owned by the Richmond would give the company an immense piece of mining property in the richest section of the entire district. The greater portion of the Albion ground is what might be termed "virgin," and once acquired by the Richmond it is probable the operations of the company during the coming summer will equal if not exceed any ever carried on by them. The ground now owned by them is by no means wholly prospected above the 1000-foot or water level, and numerous "pitches" are yielding large quantities of ore of good grade. The Albion property has, practically, been idle since the commencement of litigation with the Richmond several years ago. Stockholders in the Eureka Co. mine have good reasons for feeling hopeful. Several of the pitches in the property are producing good ore in large quantities, and a station is about completed on the fourth level to accommodate a diamond drill, which will shortly be utilized to prospect a large block of untouched ground in that locality. Then, too, the company are having constructed new machinery, to be used for draining the mine of the water in the lower levels and for hoisting purposes. This machinery, according to the agreement with the Union Iron Works in San Francisco, as we understand it, is to be finished by the 15th of May. When once on the ground and in working order it will be used for the ultimate purpose of sinking the main shaft of the mine and prospecting the property at depth. Supt. Hank Donnelly, one of the most practical and conservative mining men on the Coast, has, we understand, unbounded faith in the permanency of the mineral wealth of the property below the water levels. It is also highly probable that the Jackson mine that adjoins the Eureka Co., on the south will be worked vigorously during the coming year. During the past year and a half it has been worked by less than a dozen tributaries. In that time four ten-cent dividends have been paid the stockholders, and the company, we are told, have enough coin on hand to pay another like "divy." Most of the ore produced is rich in gold. As yet the upper—that is, above water—levels are not more than half prospected. The property includes half a dozen original claims. The Phoenix mine adjoins the Jackson and also the Eureka Co. It is worked on a decidedly limited scale, and, as a consequence, is not making the showing that it should. The few tributaries working in it make an occasional shipment of ore to the two reduction works in town. Like many other corporations represented in the district the Phoenix is probably waiting to see what some of its neighbors are going to do. On Prospect Mountain are many properties that will be actively worked, among which will be the Lord Byron, Home Ticket, Dunderberg, Lizzie L, Silver Connor and a dozen or fifteen equally as good. Work is being carried on now in many of them, but in most cases it is of a "dead" character. On Adams Hill the outlook is flattering. The Bowman Co. continues to make occasional shipments of ore to the two reduction works in town. Last year they added several claims to their original property, and now they are negotiating with Messrs. Chamberlin and Adams, two ex-Eurekans, for the purchase of the Rosina claim. The work they are doing in their property is limited, but it bids fair to reach large proportions during the coming summer.

Genoa District.

ANOTHER PROMISING DISCOVERY.—March 26: *Courier*: It is claimed that a ledge 100 feet wide has been discovered about half a mile north of Sierra Canyon, in Genoa district, by Dr. Algerier. He has named it the "Nevada mine," and claims that five feet of the vein is very rich in silver, and carries a high percentage of gold. The remaining ninety-

five feet is claimed to be good pay ore. The old Sierra tunnel will, when extended about 1,000 feet further, cut this vein, and the proposition is to reopen it and begin systematic work.

Hawthorne District.

LAPANTA.—Walker Lake *Bulletin*, March 25: Developments of ore in the Lapanta increase in size and value from week to week. In the lowest working there is now a six-foot vein of the rich white quartz which appeared in a few places near the surface. At another point a body of quartz which is spotted with coarse gold, has been uncovered. The mine has about doubled in value since the negotiations for the sale were broken off and the agents for the English company are now doubtless regretting their delay in making the purchase.

Jackson District.

MILL RUNNING.—Silver State, March 26: Joe O'Neil, who arrived yesterday from Jackson district, says the new mill is running steadily and doing good work. A body of what is believed to be very rich ore has been struck in the bottom of the Pennsylvania shaft, at a depth of about 35 feet. The camp is lively and everybody is at work.

Jefferson District.

CHLORIDERS.—Belmont *Courier*, March 20: The chloriders of Jefferson continue to take out good ore.

Manhattan District.

WAITING.—Belmont *Courier*, March 20: Work will not be resumed in the mines of Manhattan district until the weather becomes more settled.

Reveille District.

DEVELOPMENT.—Belmont *Courier*, March 20: The work of development goes bravely on in the mines of Reveille district.

Tuscarora District.

GRAND REVIEW.—Times-Review, March 26: South drift on the 200-foot level extended 18 feet, and south drift on the 300-foot level 15 feet. Stopes are producing some ore, but not enough to keep the mill running.

BELLE ISLE.—North drift from east crosscut No. 1, 450 foot level, has been extended $\frac{1}{4}$ foot with no material change. Belle Isle and Navajo joint crosscut has been extended 13 feet the past week.

NAVAJO.—No. 1 upraise on east lateral has been carried up 5 feet the past week. No. 2 upraise on east vein, same level, has been extended 11 feet; total height 109 feet. Crosscut No. 2, 250 foot level, has been extended 4 feet; rock getting more favorable for progress.

Tybo District.

A REVIVAL.—Belmont *Courier*, Mar. 20: The people of Tybo are of the opinion that with the advent of summer they will see a revival of mining there. J. D. Page, of Tybo, informs us that he has been working all winter in his mine on the hill opposite the Two-G property. He has encountered some very rich silver ore, and he believes that the mine will prove a valuable one in the course of time. Some time ago he sent a sack of ore to Eureka for the purpose of having it tested to ascertain its value and the result proved very satisfactory. The Gilmore brothers continue to work their mine at Tybo with very encouraging results. It is now sufficiently opened to render it a desirable property for a company of capitalists to handle. Quite a large quantity of good milling ore is exposed ready to stope. This ore assays from one hundred to over two hundred dollars per ton.

ALASKA.

THE GOLD FIELDS.—Cor. *Examiner*, March 28: The whole of Alaska Territory is more or less a gold field needing capital to develop it, quartz of a low grade, but in immense quantities being found on every hand. The Treadwell mine on Douglas island, almost opposite this camp, is an example of this. They have the largest quartz mill in the United States, viz., 120 stamps, working night and day, and averaging over \$50,000 per month. There are rich diggings, both placer and quartz, four miles from Juneau in the basin, but owing to its inaccessibility and the lack of water and capital invested to bring it in, they are not worked to one-tenth of their capacity. There are good diggings almost in the town on Gold creek, but the same obstacles render them valueless and idle. The Yukon river excitement has broken out with increased vigor. Hughes, the explorer, started two weeks ago for the new diggings, closely followed by at least a dozen different parties of explorers and prospectors. Hughes is the man who returned to Juneau last fall with sixty-two ounces fine as the product of eleven days work. From latest information the new find is located on Stewart river in the northwestern Territory. There are rumors of a large party of Montanians who have started for it from Benton, Montana, but they will never reach it that way. There is only one route, from Frisco to Portland, from Portland to Juneau City via steamer Idaho, from Juneau to Chilcoot, thence by portage over the divide to the lakes. There they build flatboats and glide peacefully down the chain of lakes to the river and the mines. Miners' wages here are \$4 to \$5 per day. Carpenters have more work than they can do at \$5 per day, as over 20 new buildings are going up and more are having the foundations laid. A new town has just been started on Douglas island directly opposite Juneau, keeping three small ferry-boats running. I would advise no man to start here without money, as although provisions, etc., are cheap, yet it takes money to outfit and to pack said outfit over the divide, but a man with a capital of \$200 can make the Yukon country with ease, and from all reports and the indisputable fact of the gold being brought out from there by Hughes and party it will be his own fault if he don't make a profitable investment.

ARIZONA.

GOLD.—Prescott *Courier*, March 27: Six tons of gold ore from the 110 mine, in Groom creek district, were recently worked by Mr. Cartmell, with a paying result. Now that snow is going, more chloriding will soon be done. Turkey creek mine owners are paying three dollars a day, out of which miners have to board themselves. Mines of Humbig district are producing a great deal of gold and silver. The bullion goes out of the Territory via Phenix, at which place the miners do their trading. Were Prescott merchants to go down there and interview them, a fair share of their business would be turned in this

direction. An engine, to run arastras, was recently shipped from Prescott to Messrs. Munn & Co., of Cherry district. A cleanup will shortly be made at the Lynx creek hydraulic diggings. It is said that the Oro Fino company are repairing bursted pipes. Word comes from Weaver that water from Hassayampa creek, will shortly be conducted in pipes to the camp.

COLORADO.

LEADVILLE.—Herald-Democrat, March 26: The lessees of the Crescentia shaft are engaged in placing a twenty-five horse-power hoister on this property. Considerable fair iron ore has been shipped from the Chieftain mine on Yankee Hill during the past winter. Manager Kroger of the Tip-Top shaft states that he hopes to have it drained and sinking resumed within a week. Mr. J. R. Loker is engaged in some interesting prospect work in California gulch, near the foot of Harrison avenue. The Wolfone mine is shipping a lot of 500 tons of ore, and is about making a contract for another lot of equal tonnage. Large shipments of ore are being made daily from the Limes shaft, in which a strong ore chute was disclosed a short time ago. The Diner mine on Sugar Loaf mountain is reported to have shipped over \$40,000 worth of ore during the past four or five weeks. The Castle View shaft on Carbonate Hill has attained a depth of 506 feet and is being sunk deeper. The last forty feet of the shaft have gone through iron ore. Mr. Paul Weitzel, the owner of the Hard Cash mine on Yankee Hill, will resume work on his property this morning. Mr. Ebe Smith has lately examined the Mike and Star mine for some of the principal stockholders, and it is not improbable that the company will resume work on an extensive scale shortly. Mr. Sanderson, of Denver, and Bill Lovell have taken a lease on the Oolyte and other claims, situated in the flat, a short distance northeast of the Manville Smelting Works, and are preparing to work the property actively.

IDAHO.

MILL.—Ketchum *Keystone*, March 26: The Columbia & Beaver mill at Sawtooth will be operated this season. The North Star on East Fork will be one of the most productive mines in the district during 1886. The Silver Star on Smoky is said to be looking exceedingly well and other Smoky properties are developing new riches. The Balcher on Boulder has ten tons of very high grade ore ready for shipment. The lowest assays 155 ounces in silver. W. D. Vernam of the Columbia & Beaver company writes to Ketchum that he will be on hand to open up the Sawtooth grade to travel next month. This indicates an active interest in mining and milling operations in that locality.

A NEW VEIN IN THE PARKER.—We learn from Prof. Jenney that a new vein has been found in the Parker mine which offers some encouragement to deep mining on Elkhorn Hill. It was struck where the old vein broke off, at a depth of 400 feet on the ledge, coming up at a much steeper pitch and apparently from porphyry through the lime formation. It is four feet from wall to wall and carries iron pyrites and traces of lead. As stated, it broke off at a deep pitch and conveys indications of a deep body. Further analysis of the character of the rock may throw some light upon the uncovered depths in that locality and even now the Prof. seems of the conviction that the ledge is of considerable significance.

WINTER ORE COMING IN.—Wood River *Times*, March 24: The miners who have been working all winter on claims at the head of Narrow Gauge gulch are about to realize on their labor by selling their ore. C. E. Bolton has taken a contract to haul 25 tons of Red Cloud and 40 tons of Argenta ore to Hailey. He has already secured three teams and broken the roads to the mines, and expects to get the ore down to Hailey by the end of next week.

MINNIE MOORE NOTES.—Up to Saturday night the situation at the Minnie was this: The ledge that was first struck proved, by actual measurement, to be 6 feet 6 inches wide from hanging to foot wall. Twelve inches of mineral was found next to the hanging wall, then two feet of high-grade steel galena and gray copper, then three feet of jigging ore of good quality. Thirty tons of high-grade ore had been extracted up to Saturday evening in running the crosscut. This will be sacked and shipped at once. Another strike on the 360 station, at the end of the west drift, was made. These in running crosscuts. No stoping yet, recollect.

MONTANA.

BUTTE.—Inter-Mountain, March 26: The mills and smelters are fully supplied with ore and are running at their full capacity. The Alice is raising the usual amount of ore. The Magna Charta is raising 10 tons of ore per day. Goldsmith is raising 200 tons per month. From the Minnie Irvine the lessees estimate that over \$20,000 worth of ore has been taken already, and the indications for its future productiveness are favorable. At the Amy and Silversmith small quantities of ore are being raised daily from the stopes over the 200-foot level; and the crosscuts from 300 and 400 stations are being run. The Germania is looking well, and is producing some very rich ore. The water is fully under control. The stopes are in about two feet of ore. The shaft of Clark's Colusa is about 430 feet deep and is being sunk to the 450-foot station. About 200 tons of ore are being raised daily from the levels and stopes. The Matt lodge, near Meadville, has been recently sold to a San Francisco company, who have begun work on the property.

NEW MEXICO.

LADRONE DISTRICT.—Socorro *Bulletin*, March 27: C. F. Adelman leaves this morning to work his Blackington claim in Ladrone district. A Harris is the general manager of the Illinois mine at Kingston, and is working it in the most orthodox manner. It is one of the best ventilated mines in the Territory. Donald McRae is shipping ore from his Lawrence mine of the Ladrone district to the Billing works for treatment. H. G. Cook, of Tombstone, A. T., is at the Parker house. He brings a carload of silver chloride ore from the Silver Cloud mine for the Billing smelter, and expects a large consignment coming from the Visna mine in the same camp, and others to follow, all for the same destination. H. C. O'Rear, superintendent of the Brittenstene Com-

pany's mines, says the Brittenstene plant is running successfully and turning out rich concentrates and gold and silver amalgam; and that the mines generally in the Pueblo district are visibly improving.

OREGON.

QUARTZ AND PLACER.—Jacksonville *Times*, March 26: Water is falling fast and most of the placer miners have commenced to clean up. Redden & Hurt are busily engaged in opening the Miller placer mines on Sardine creek. About one-half million dollars will be taken out of the mines in Jackson and Josephine counties this season. Many claims have been located in the Wagner creek district, and everybody there is waiting for the arrival of the mill, which is expected soon. A large amount of quartz is being hauled to the mill at this place from Geo. Schump's ledge in Willow Springs precinct. It is now being crushed. Messrs. Ingram, Dean, Baker and Farrar of the Willow Springs district have made a partial cleanup, and brought a respectable amount of gold-dust to town this week. Jas. McDonough & Co. are engaged in running a tunnel to tap their quartz ledge, better known as the old Dunham mine, and have some promising quartz already in sight. Grob & Braendel being satisfied with the result of the cleanup made at the quartz mill here, after running several days on ore from their mine, are continuing work. As the quartz which was crushed was principally from near the surface they expect to make a much better report next time. McKenzie, Brown & Co. had nearly twenty tons of ore from their ledge on Jackson creek crushed at the Jacksonville quartz mill last week, which paid them between \$7 and \$8 per ton in free gold, besides which there was a considerable quantity of sulphurates, which no doubt contained some gold also. As the rock was not considered choice, by any means, they feel quite hopeful of making a better showing next time.

JUMP-OFF-JOE.—Grant's *Pass Courier*, March 26: We learn that the miners on Jump-off-Joe are working steadily, and have plenty of water. The season has been unusually favorable in that respect, and there is every indication of a good cleanup when the water falls.

ALTHOUSE.—March 19: The Guirdaldia Bros. are steadily at work ground-slucing, and will not commence to clean up until some time in June. Henry Drew on lower Grass flat has got his new drift now open, and has favorable prospects for a good summer's work before him. McLaughlin is still ground-slucing on the east side of the creek opposite Grass flat. Joseph Trimby is piping away a large amount of ground on the left hand fork. This ground has paid very rich in times past, and the considerable ground yet left. James Turnbull, after nearly three months blasting through hard bed-rock, has again struck the pay gravel in his tunnel on the upper end of Grass flat. Antone Miller on the head of Althouse is taking out some very pretty gold. He got one piece the other day valued at about twenty-three dollars. The water season is very short on this claim, were it otherwise a large amount of dust would be taken out every season. Hansen & Co. are preparing to bring their claim into shape for cleaning up. Water for the past two weeks has not been plentiful with them for piping, and the drip, drip, from the clouds does not give promise of a much longer water season. April will, for the most part, let out the piping operations on this creek.

UTAH.

THE TOOOLE MINES.—Salt Lake *Tribune*, March 25: Mr. C. E. Mitchener, manager of the mines and mill belonging to the Honerine Company at Stockton, was in the city yesterday looking after business, and among other things urging the Union Pacific people to extend their Utah & Nevada road to Stockton. Regarding this proposition he said it was as yet a question of doubt, but hoped that the company would consider the matter favorably in the interest of the camp. Respecting the mining interests about Stockton, Ophir and Dry canyon, which really form one district, Mitchener expressed the opinion that the district was destined to become one of the best in Utah, even if it had been considered a played-out camp for several years. A big strike has been made on the Silver King owned by the Neidringhaus syndicate. On the 400-foot level an ore chute was struck, on which drifting has been done a distance of 117 feet, all the way in ore, and it is not known how much further the chute extends. This ore averages all of \$30 per ton, the first-class running up to \$60. They are now drifting on the third and fifth levels to tap this chute of ore. On the Calumet, belonging to the same company, they are down to the 300-foot level, where the ore chimney is stronger and better than at any place above. The ledge is seven feet wide, and it is not known how long. The ore is worth about \$75 per ton. The company are doing only development work on their mines, and simply taking out such ore as is cut in such work. The Lion has improved much in the past two weeks on the bottom, or 350-foot level, where a drift south has been driven fifty feet through ore eighteen to twenty inches wide, one-half of which is solid galena. It is being worked under lease by two men who, with the help of a third person, are taking out a ton of \$80 ore per day, which is certainly a splendid result for a mine under lease. Regarding the Honerine, Mr. Mitchener said they were retrimbing and doing dead or development work at present, and not extracting ore. Within the past three weeks they made an important strike on the 100-foot level, into which they drifted forty feet and were still in ore from four to five feet wide. A winze is now being sunk on this to open an air passage, so they can work to better advantage. The company are running their concentrator at present on ore from the Catherine, belonging to the Fritz Hill Mining Company of Chicago. The mill concentrates fifty tons of ore per day to ten tons of concentrates, averaging sixty per cent lead and sixty-five ounces of silver, making the value about \$100 per ton. The owners of the Catherine are clearing about \$10,000 per month out of their property. Regarding shipments of ore from Stockton, Mr. Mitchener says it is now about 1000 tons per month, and he believes that during the summer it will average 3000 tons. The Mono is being developed by Matt Gibson, who takes out enough ore to pay expenses, and is looking to the future for a great bonanza in the Mono, which in the past was such an immense producer, but has been idle for several years.

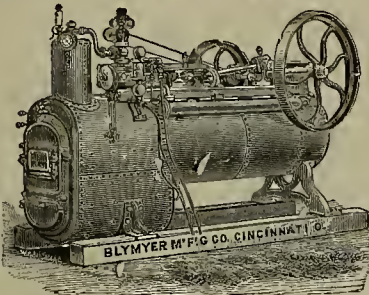
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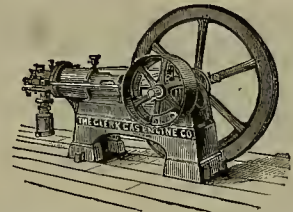
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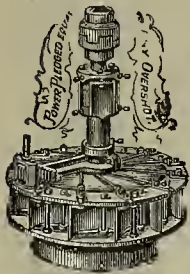
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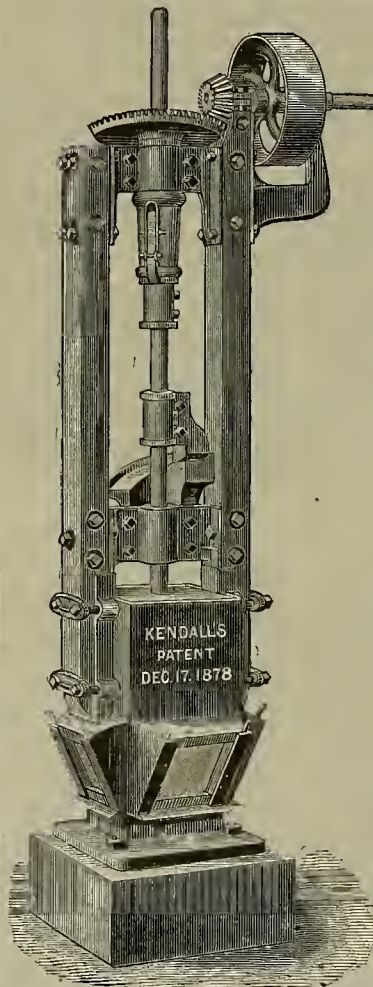
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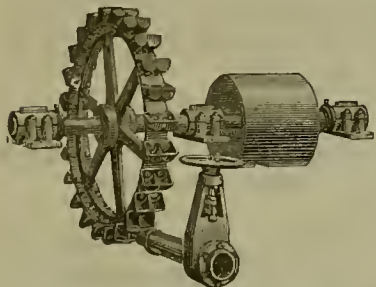
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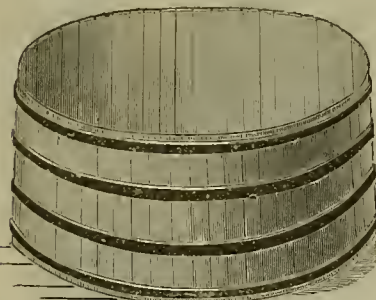


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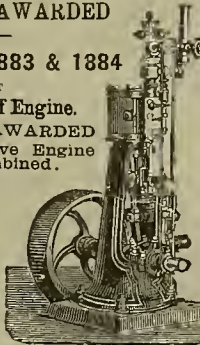
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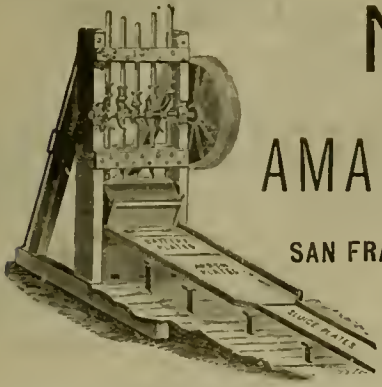
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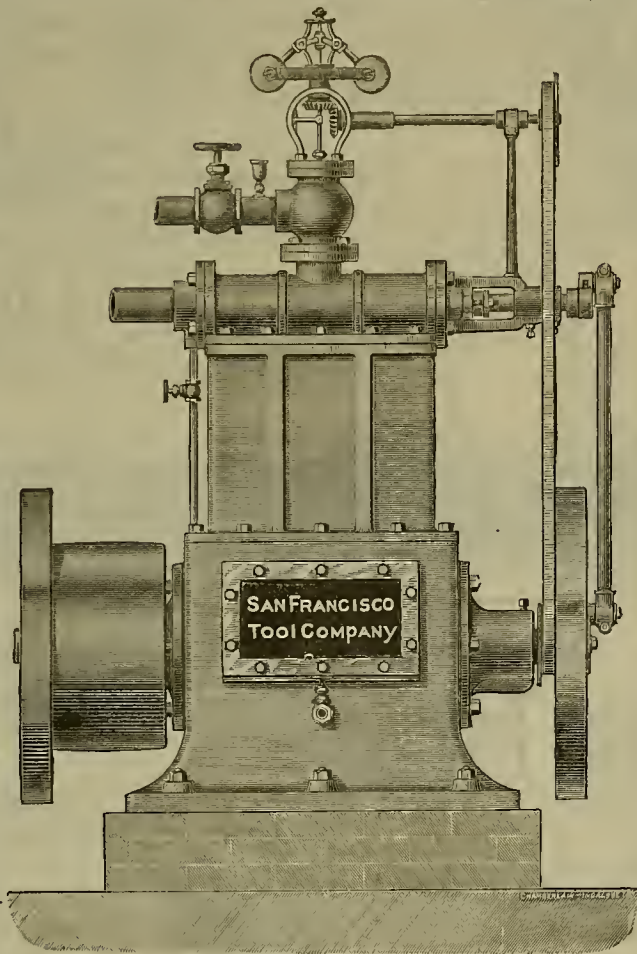
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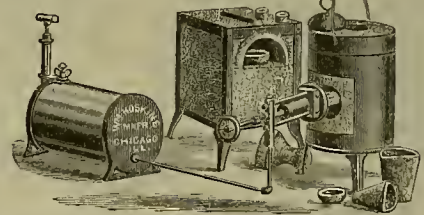
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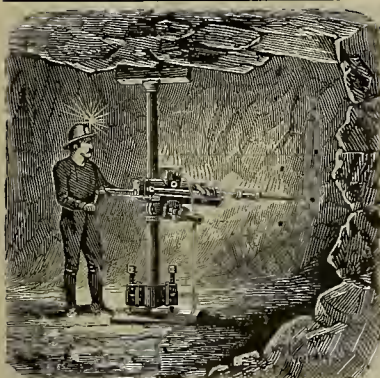
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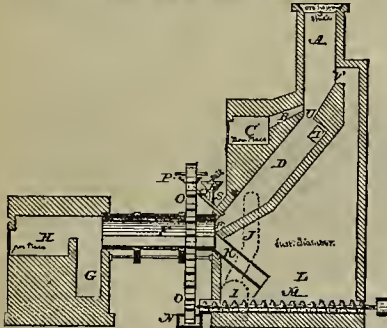
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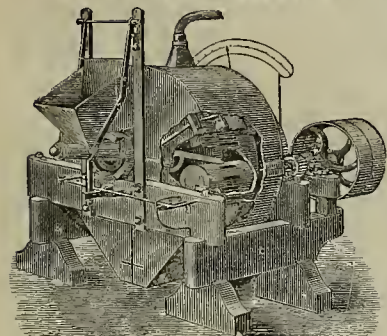
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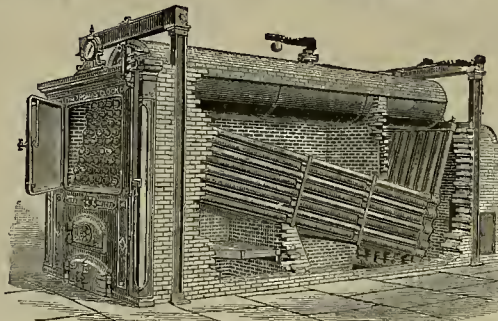
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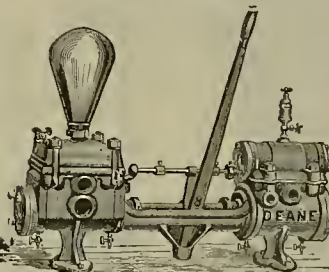
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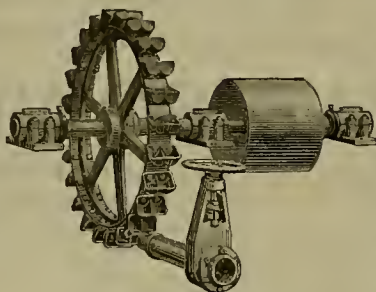
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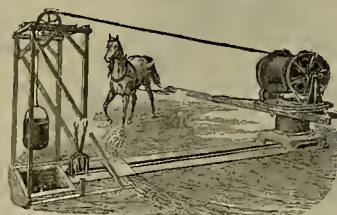
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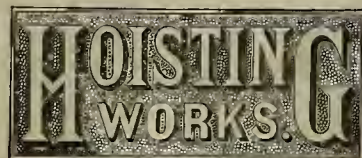
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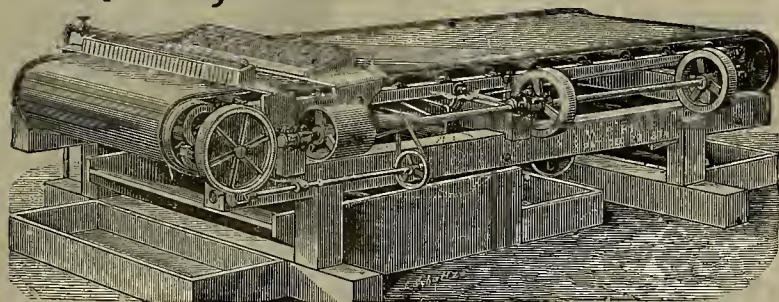


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500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



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OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

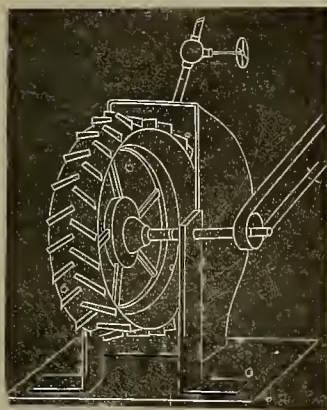
Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

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This wheel positively has no dead points, no cut-off, and works up to a higher percentage of the power applied than any wheel in use. In this wheel there are two rows of buckets arranged obliquely around the periphery of the wheel, standing out vertically on a line with the center of this wheel, leaving a water-way from and to each bucket alternately.

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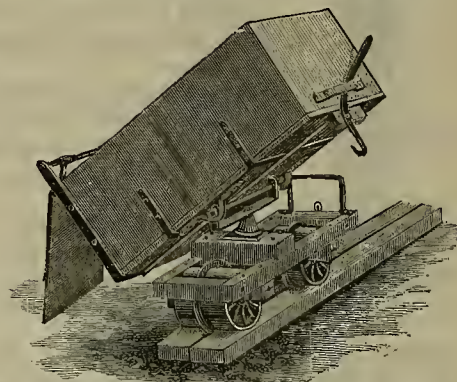
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Which we can Sell for Less than Half
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They are designed especially for

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This Car has two double Tread Wheels that carries it on two pieces of scantling laid side by side, two inches apart, making a track ten inches wide for the car driver to walk upon, and only requires a narrow space in the tunnels or drifts for the track.



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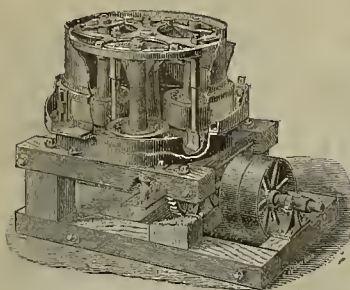
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NOTICE—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON,

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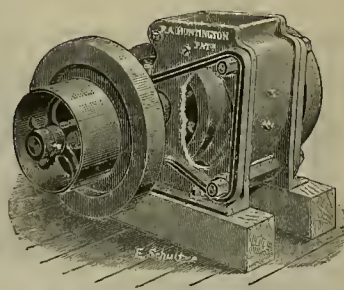
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HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. Note—Have just completed order for 35 miles of 44-inch

pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

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REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship

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Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mounts

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, APRIL 10, 1886.

VOLUME I-11
Number 15.

Working Gold and Silver Ores.

Cheap Methods for Prospectors and Miners—No. 1.

There are many places on this coast where miners or prospectors are waiting for stamp mills, while if they went about it energetically they could work out their own salvation with arrastres or Chilian mills. These appliances are by many considered "primitive," as they are old-fashioned, but anyone who has had experience with them will vouch for their efficiency and activity. They do not work as fast as quartz mills, but by their means more gold or silver is saved. These appliances are found in the most perfect form in Mexico, where thousands are in use to-day, and no one can deny that the Mexicans know how to work ore as well as any metallurgists in the world. Mr. E. C. Van Blarcom, now of Oakland, who spent some years in Mexican mines, furnishes us with some drawings and notes made while there, which give many interesting details of the methods of working these appliances, and working ore in them. The arrastre may be described first, and the Chilian mill, settlers, etc., in next week's PRESS.

The Arrastre.

The bed of the arrastre is made much the same as the bed of the Chilian mill (hereafter described), with precautions to make it tighter. The paving stones should be laid on a bed of well-puddled clay from three to six inches thick. The stones for the pavement should be laid as closely as possible and the joints well tamped with clay.

Directly in the center of the arrastre a fairly large sized stone must be laid; this is to serve as the step for the peon or pivot. The step may be a small hole sunk in the rock, or an iron step may be let into the stone. The sides of the arrastre are made as in the Chilian mill, any holes being tamped with clay.

The peon is made from any convenient piece of timber. It can be made from two pieces of four by eight inch stuff, clamped together with iron bands. A hole is bored in the bottom of the peon and a piece of two-inch round iron, worked off to a rounded point at the lower end, is let in. This is the pivot on which the machine revolves. The end of the peon should have a wrought-iron collar to keep it from splitting.

Through the peon, at right angles to each other, are passed two pieces of four-inch square stuff, or small saplings dressed down will serve very well. One of these, *h* (Figs. 1 and 2), extends out from the peon seven feet six inches. To it the mule is attached and it is made to rotate in the direction of the arrow. To the other bar, *c* (Figs. 1 and 2), are attached the mullers or grinders, *g* (Fig. 1).

The grinders are of stone dressed out roughly with a stone mason's hammer. They are prismatic in shape, 36 inches long and about 15 inches wide on the grinding face when new. The stones should be dressed so as to throw the center of gravity below the center. This will keep the stones from turning over when the machine is in motion.

At the upper edge of the front face in each stone two plug holes, about six inches deep, are drilled; to these holes are fitted plugs of dry sugar pine; when these plugs get wet they will swell, and it will be almost impossible to remove them. A knot is left on the projecting end of each plug to keep the ropes, by which

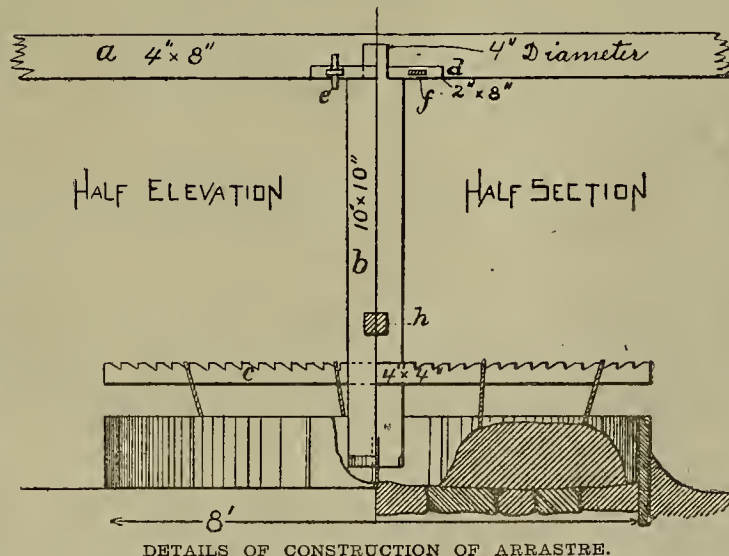
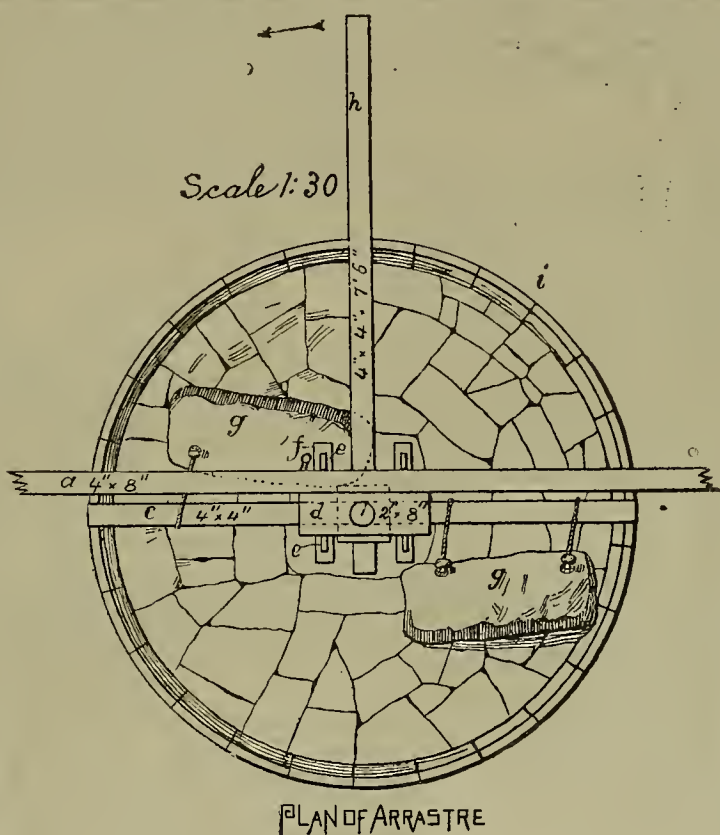
they are attached to the cross-arm, from slipping off.

In attaching the grinders to the cross-arm, one should be attached so as to work close to the outside edge of the arrastre. The outside end of the stone should work in advance of the

made in the timber, *a*, (Figs. 1 and 2). By means of a wooden link, *f*, and pins, *e*, the collar is secured to the timber, *a*.

The timber, *a*, must be long enough to clear the mule walk.

When the arrastre is under cover the ends of



DETAILS OF CONSTRUCTION OF ARRASTRE.

inside end. This will throw the charge toward the center. The reverse of this arrangement should be observed in setting the other stone.

The upper end of the peon is worked into a pinion four inches in diameter; this pinion works in a hearing collar, *d*, (Fig. 1) made from a piece of two by eight inch stuff; near each end of the collar a mortise one by three inches is carried through; corresponding holes are

the timber are built into the side walls of the building. If there are no walls small columns of masonry can be built up to receive the end of the timber.

In whatever manner the timber is secured care must be taken to have it rigid. With an arrastre 10 feet wide two mules can be used, and the charge should be 600 pounds. Grease must not be used on this machine.

The Big Bend Tunnel.

The greatest tunnel enterprise ever undertaken in this State will probably be brought to completion next week. This is the Big Bend tunnel on Feather river, 16 miles above Oroville. The tunnel is 12,000 feet long, 16 feet wide and 9 feet high; at the upper end it is 32 feet wide. The fall is 30 feet to the mile. The tunnel is cut across the head in the main Feather, and will free the channel from water for a distance of fourteen miles. This channel is the bottom of an immense canyon, and is believed to be exceedingly rich in gold deposits. What few bars have been worked have been found rich, and the river above and below has paid its millions. The nature of the ground has heretofore prevented working in the canyon, as the river could neither be wing-dammed nor flumed. When the tunnel shall have been completed a dam will be built across the Feather sixteen feet in height about 100 in length. This will turn all the water into the tunnel that it can carry, and whenever all the water in the river is sent through it the 14-mile head of the river will be open for mining operations. In stages of high water the surplus will flow over the dam and mining operations below will necessarily cease. The company has been three years and four months building the tunnel, at a great expense. Superintendent Harris is of the opinion that better and quicker work was never done under similar circumstances.

The work is done by Burleigh drills which have been in every way satisfactory, the records showing great efficiency at low cost. The record of the month of March is as follows:

Total number of holes drilled, 914; total depth of holes drilled, 5,468 feet; average depth of holes drilled, 5,982 feet; number of pounds of No. 1 powder used, 3,150; number of drills sharpened, 1,268; time occupied in drilling, 140 hours, 25 minutes; average time per shift, 1 hour, 31 minutes; number of carloads of rock extracted, 3,815.

The tunnel was advanced during the month of March, 340 feet; previously reported to March 1st, 11,567 feet; total tunnel built to April 1st, 11,907 feet. Number of working days, 31; number of shifts worked, 93; average progress per shift, 3655 feet; average progress per day, 10,987 feet; average number of drills per shift, 13.6; average number of cars per shift, 41; tunnel to complete (April 1st), 100 feet. For the past month the rock has been principally slate. During the last ten days of March the rock was broken, needing timbers to hold it up. The superintendent expects to see light through the end of the tunnel about the 15th. We shall shortly give a description of this enterprise, with such details as are of interest to the mining public.

The outlook for the mining interests in Idaho was never so promising as at present. In eight of the fifteen counties in Idaho there are prosperous mining camps, and as the work of prospecting and developing goes on, each year adds to the number of paying mines. Until recently Idaho has been isolated, but with three railroads now traversing the Territory the mining camps in all the counties are easily reached.

TEO BECHMAN struck a very rich pocket at Spring Gulch, about four miles south of Big Oak Flat, Tuolumne county, last week. He has taken out over \$10,000.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

A Hole-in-the-Ground "Pome."

[Written for the Press.]

There was a man, Jack Shay by name,
Who prospected for gold,
But did not care a cent for mines,
Unless they could be sold.

His hair was long, his garb was rough,
Quite often he was "broke,"
But when he joined a poker game,
His was a winning stroke.

He had a bright but furtive eye,
A bold and reckless will;
His conscience was some dead, hard thing,
Beyond the preacher's skill.

When clambering over rugged hills,
Jack found a bunch of ore;
And planned to "hook" a moneyed man,
Its treasures to explore.

One day Augustus Percy Dod,
A New York millionaire,
Looked into Shay's square prospect hole,
And fancied something there.

It had a dainty "salted" vein,
With rich ore full in view;
Which Jack had "cribbed" from well-known mines,
To make his sale "go through."

Then Colonel Dod hired an expert,
With "M. E." to his name;
Whose talk of "metalliferous ores"
Had brought him frontier fame.

"Professor" Spiggins viewed the claim,
Through spectacles so clear,
That he could see a tempting prize,
Approaching very near.

Said he in tones well understood,
"Look here, shrewd Mr. Shay,
My word can sell this ground-hog's hole,
But I must have my pay."

"How much," asked Jack, "speak out at once,
I'm always on the square;"
"Five thousand will the sale complete,"
"All right—the payment where?"

"I'll get the coin from your own hand,
The day the bank pays you."
And so it came that this "M. E."
Did "float" the Merry Blue.

In his elaborate report,
He showed his wondrous lore;
And used such tongue-disturbing words,
As ne'er were heard before.

Said he, "this lode is mineralized,
E'en to its very core;
Free gold in cupricaceous form,
Gems all its finest ore.

Its matrix cyanized and strong,
Its tenor down will hold;
Its hypogeanous cubes
Are rich in vitious gold."

This bright report pleased Colonel Dod,
Who sought no higher skill;
But fearing Shay might now "back out,"
Made haste his check to bill.

The price was paid, a large round sum,
Which Jack expressed that day,
Then galloped off, ere the expert
Could come to get his pay.

Jack Shay is now a city snob,
And owns a broker's seat;
Perhaps he may again come west,
And beans and bacon eat.

In his old camp his fame is great,
None doubt his master-skill;
Such genius and such grand success,
With pride men's bosoms fill.

For twenty dollars Ashengab
Helped Shay by printing lies;
Then claimed his *Weekly Bugle Snort*
Gave Dod a marvelous prize.

And Percy Dod in corporate form,
Joined great names to his own;
And "milked the street" that he might build
A huge bonanza throne.

And later still, when work had "smashed,"
The barren Merry Blue;
The *Bugle Snort* pronounced it rich—
A fissure, deep and true.

'Tis through such acts that mining flags—
That it is gambling thought;
And mines that promise good returns
Lie idle and unbought.

But time will wear out cheats and stocks,
If greenhorns cease to buy;
And ore will be the miner's crop,
"As good as wheat" or rye.

JETHRO JETHRINGTON.

Weight and Drop of Stamp.

EDITORS PRESS:—I noticed an article in your columns of some time since, relative to stamp mills, and that weight is the most profitable for mine owners. I have been in the quartz milling business for 21 years. I have had many opportunities of testing the capacity of different weight stamps, and the proper way of working them up to their full capacity. My experience teaches me that stamps weighing 1000 pounds to the stamp should have a double discharge, a 400-pound stamp mill or 600-pound stamp will

will discharge through a single screen as fast as the latter weight can crush. Eight years ago I had an opportunity to test the difference between double discharge and single discharge batteries with the same weight of stamp. A 900-pound stamp of five stamp battery crushed with a double discharge through a No. 40 screen, 14 tons per 24 hours; drop 90 per minute and with same drop with single discharge only pulverized 10 tons per 24 hours; therefore, heavy weight stamps are the most profitable for low grade mine owners. A ten stamp mill of 1000 pounds stamp will crush with double discharge 24 tons per 24 hours. Care should be taken that the stamp rise above the water in the battery before dropping so as to create a splash; otherwise the screen will get choked or clogged up so as to prevent discharging freely. I find a great many millmen that do not allow the stamp to rise above the water before dropping. This will only cause a stop-over and will not crush as fast. My motto is to crush as fast as possible and provide well on the outside copper plates and sluices to save that which is discharged as it is easily done by using concentrators. I. C. F.

Redding, Shasta Co.

Butte County Mines.

Channels of the Dead Rivers.

EDITORS PRESS:—I thought it might not be inappropriate to drop you a few lines, in regard to the mining interests and prospects of this region. About one-half of Butte county is composed of foothills and mountains, which are vastly rich in timber and minerals; the other half contains the best wheat and orchard lands in the State.

I have been mining in this locality for the last 30 years; have noted all its strikes and failures, but wherever persistent effort, coupled with capital, has been brought to bear, it has been crowned with success. The Birch and Barrett tunnel that was worked away back in the fifties, paid enormous dividends, but owing to a difficulty in regard to drainage, it lay idle for several years. But John Barrett, one of the original owners, some 10 years ago put in a steam pump, and after drying the claim, opened up the best drifting digging in Northern California. After working it several years with splendid results, he sold out to Mr. Pershbaker, who is now working it successfully with powerful steam pumps to dry the channel. The gold is of a gross heavy quality, the pieces ranging from one dollar upwards. This channel poits in a southwestern direction, and runs under the great lava-capped mountain that divides the west branch of Feather river from main Butte creek.

Under this lava cap of the mountain lies a stratum of gold-bearing gravel from six inches to many feet in depth. Of course the gravel is thicker in the center of the original channels that laid their deposits so many millions of years ago, but the imperishable gold lies there in its silent tomb, awaiting resurrection by the persistent energies of man.

About two miles below the Pershbaker mine the channel of an ancient river crosses Little Butte creek, coming from the northeast, from the great granite basin of Plumas county, and pointing to the southwest. The channel of this dead river is perhaps 1000 feet wide from rim to rim, filled with smoothly washed boulders of quartz, granite and marble. The Little Giant Company sunk a shaft on it to the depth of 200 feet, but as yet have not been able to find the bottom.

Two miles further southwest the Wiley Bros. have found a rich deposit of coarse gold, which is supposed to be on the same channel or a tributary of it.

The late Thomas H. Blythe, of San Francisco, started the Mammoth tunnel on the southwest side of the mountain to probe the bed of this great channel.

The tunnel was driven about 1000 feet into the hill, and from late developments he was on the proper course, but since his death the work has not been pushed forward to completion.

From recent developments made in the Hupp claim which joins it on the south, he would not have to run more than 400 or 500 to reach the channel. The Hupp claim just mentioned is a hydraulic claim, and has been worked every winter since 1870, until about two years ago, when it was purchased by the Butte Creek Hydraulic Mining Company of San Francisco, who had constructed a large ditch from main Butte Creek. They completed their ditch down to the bill, and turned their hydrants or giants upon the immense body of gravel that juts out on the southwestern side of the lava mountain, some three miles southwest of the Little Giant shaft. This great mass of gravel stands from 50 to 150 feet in depth, and is composed of granite quartz and marble boulders smoothly washed.

This company under the superintendence of Mr. Wait, has built big brush dams below their claim to impound their tailings, so as not to injure the farmers below in the valley.

I visited the claim the other day, and was astonished at the progress they have made since opening their water battery on the hill. On the south side they have piped up quite near the great lava bluff that caps the gravel deposits. The hill has been piped off around its

base in the shape of a delta, until they have reached a gorge in the mountain, and to all appearances have dropped into the edge of an immense channel that has been cut by this sweep of a large river perhaps millions of years ago, pointing like all the submerged channels of this region, southwest and northeast.

I saw some fine specimens of gold piped out from the edge of this channel that were simply grand to look at. It is of a coarse quality, smoothly washed and stained of a dark color; it is similar to the gold found by Pershbaker, Wiley and others from croppings or tributaries of the channel of this great dead river—the tomb of fabulous wealth.

This hydraulic company having struck into the southwestern end, or outcome of this channel, when they bottom it, as they no doubt will, can work, it by this drifting process, as they will have an up-grade to work on.

These dead river channels, and there are four or five prominent ones in this county, with the exception of Cherokee Flat, remain comparatively undeveloped. They will mostly have to be worked by drifting.

The great mother quartz belt of the State has been traced from Grass Valley, Nevada county, in a northwestern direction by way of Smartsville, Oregon Gulch, Cherokee Flat, Sawmill Peak, and thence up to Meredith's quartz claim, on Big Butte. At Yankee Hill, near Cherokee Flat, on the line of the belt, was found a quartz boulder weighing 150 pounds, one-fourth of which was gold. At Sawmill Peak, ten miles further northwest, on the same line, was found a solid chunk of gold weighing 56 pounds, in the Willard claim.

All the channels of these dead rivers cut this mammoth belt at right angles, and precipitate themselves to the southwest into the Sacramento valley; hence it is no wonder that they are very rich in the auriferous substance, as it is the action of water that brings gold together after it leaves its mother quartz.

The Butte Creek Hydraulic Company has made a discovery that will no doubt lead to the unearthing of millions of the needful, and in the near future give employment to thousands of men; it shows also that mining in this region is just in its infancy.

Centerville, Butte county, Cal.

Hints for Lubricating.

EDITORS PRESS:—The Boston Manufacturers' Mutual Fire Insurance Company has adopted a standard of a perfectly safe lubricating oil, which is that it shall have a fire test of 300° and, at a constant heat of 140°, evaporate not more than five per cent of volume in 12 hours. Such an oil, it guarantees, is perfectly safe from all risk of spontaneous combustion, and concerns using it are more insurable than those using pure animal or vegetable oils.

It is encouraging to see so much sense on the part of insurance companies. Although, to do justice, practically there has never been any inclination to distinguish against pure mineral oils. There have been recently five cases of spontaneous combustion from mixed neat's-foot oils. If such oils are used, great care should be taken that they be kept in a safe place and condition.

The time will come when it will be considered ridiculous to mix or adulterate any mineral oil with an animal oil.

Regarding the standard of oil above described, purchasers of lubricating oils need only be careful of observing the first requisite, viz., that the oil shall have a fire test of at least 300° Fahr. That is easily shown by an ordinary test with alcohol lamp. The second requisite, viz., that of evaporating not over five per cent of volume in 12 hours, need not be heeded, as every oil which satisfies the first test is certain to satisfy the second. CHAS. J. WOODBURY.

123 California St.

SENSE OF SMELL IN INSECTS.—Professor Graher has made an extensive series of experiments on the degree and localization of the sense of smell in insects, etc., from among the results of which the following will be found of interest: Odors are perceived by many invertebrates, such as mollusks, insects, etc., with extreme rapidity, sometimes in one-third of a second, and even through an intervening layer of water a half-millimeter in thickness. Insects deprived of their antennae are still able to smell, but in varying degrees in different insects and for different odors. In some cases the palpi of the mouth organs are more sensitive than the antennae, and therefore the latter cannot be considered as being alone the organs of smell.

THE ATLANTIC AND PACIFIC GRANT.—It was telegraphed from Washington on March 24th that the Secretary of the Interior has rendered a decision in the case of the Atlantic and Pacific Railroad, in which he holds that he has no legal claim to the land along the line of the road from San Buenaventura, on the Pacific ocean, California, to San Francisco, and directs the Commissioner-General of the Land Office to restore the same to the public domain. The fact that this line has been mortgaged and money raised on its credit, is, the Secretary adds, a misfortune to the mortgagees, in that they took a mortgage on land to which the mortgagees had no legal right. The decision restores to the public domain 2,451,200 acres.

Is Our Population Increasing Too Fast?

Some of our contemporaries are greatly exercised because immigration to this country appears to be falling off, while others are moving heaven and earth, organizing immigration societies, and urging capitalists to raise money to send agents to Europe, and elsewhere, to make known the barrenness of our country in population, and the opportunity which is offered here to buy and build up homes. This country is represented as a paradise, for both the poor and the rich;—and so it is. There is no place in the wide world which presents such opportunities for poor men as the United States. We have an abundance of land while high wages everywhere prevails—when men can get work. Neither is there any place where capitalists can make so much money out of coming immigrants as here. They buy up land by the hundreds of thousands of acres, divide it up into farms and town lots and sell it to the poor emigrants for two, three, and four times as much as it cost them. And still the land is much cheaper and better than any which can be bought in the "old countries."

All this and more is true. But are we not rushing things too fast? It is one of the characteristics of the American people that they nearly always overdo whatever they take in hand. Are we not rushing too fast into this immigration business? Let us look ahead a little and make a few figures.

Our population doubles every 33 years. At that rate of increase the population to the square mile in the United States will reach that of Europe, at the present time, in 83 years.

But supposing there should be a falling off in the increase to such an extent that our population should require 40 years to double. Even with that slower rate of increase we should reach the density of the present population of Europe in a fraction short of 100 years.

Now what does such an increase mean? What is the present condition of the people of Europe in regard to population? Why are people leaving that continent by thousands and coming to this country? Is it not because of the manifold evils arising from the density of population there—because there are too many people to the square mile? Most certainly such is the case.

Is it then a wise course on the part of our people to hurry up our population by artificial stimulus, so as to bring this continent, also, into the same unfortunate condition in less than one hundred years? Have our political economists made or thought of these figures; has it occurred to the masses of our people that we shall reach the overcrowded condition of Europe within the lifetime of some of our children now living? Is it desirable that, within the brief space of less than 150 years, our population shall be more than twice as dense as that of overcrowded Europe at the present time? In holding out special inducements for immigration hither, are we not surely fastening upon our immediate posterity all, and perhaps many more, of the ills that now afflict overcrowded Europe and Asia?

The above and many other conditions which must surely follow our present policy in regard to population, are matters for the most serious consideration of the American people. We append, as pertinent to the above, the following truthful utterance of Adolph Mentser, a rich Amsterdam merchant, who, though a large capitalist, has resolved to get away from the terrible struggle which is not only pending, but which has been actually inaugurated in Europe. He says:

"Europe has swarmed; its hives are no longer capable of holding its starving millions. Men cannot live on wind. This is the cause of the present London terror—the empty stomachs of its agrarian and socialistic mobs demand bread. Matters in this respect throughout all Europe will grow worse. Hence I consider capital and life there no longer safe. Therefore I come to America for safety."

The Amsterdam capitalist talks sense; but we fear he is fleeing from evils seen to those he knows not of.

FOREST LAWS IN INDIA.—A recent report to the British House of Commons showed that by the operation of forest laws in India, where there was formerly a terrible waste of timber, the revenue from forests has increased tenfold, yielding a net profit of \$2,000,000. The experience of other countries exhibits equally good results. It has been difficult to arouse public interest in the subject of forest preservation in this country, but the time is not far distant when the deficiencies in the present policy of the country on this matter will become glaringly apparent.

RUSSIAN LABOR RESTRICTIONS.—The Russian Government has issued a decree, prohibiting, for a term of three years, the employment of women and children under the age of 17 years in cotton, linen and woolen factories. This step has been taken so as to reduce the output of textile manufactures and put a stop to overproduction.

THERE is considerable excitement over the fact that petroleum has been discovered a few miles north of Albuquerque, N. M. The exact flow is not known; but it is said that the quality is very superior.

MECHANICAL PROGRESS.

Tempering Taps and Other Small Tools.

In some shops, and particularly so in the smaller and less pretentious ones, says *American Engineer*, we are often called upon to form and temper our own tools. To do this and make a successful job, it often seems as though one must be blessed with a run of good luck, in addition to his usual dexterity. Now then, to make and temper a tap for instance, is very easy said, but not so easily done; and as we have been having some exceptional success in tempering these articles in a common blacksmith's fire without the use of charcoal, we thought that perhaps our method of procedure might be of some use to our readers if they have not already tried it. In the first place, in drawing down the steel to the proper size, of course care must be taken not to overheat the steel, though it may be manipulated under the hammer until it is so cool as not to show its redness, with good effect, if the blows are not too hard. Having turned up the tap, fluted it and "backed-off" the thread, polish it, taking care not to injure the cutting edges, you will then be ready to temper it, and we have found the following a handy arrangement for heating in a blacksmith's fire: Take an old piece of steam pipe, or other iron cylinder, about 15 or 18 inches long, and large enough to admit of the tongs holding the tap being passed into it. Plug up one end of this pipe solid with some non-combustible substance, such as a bit of clay, and bung it in the fire with the open end toward you and slightly higher than the closed end. Take care that no bits of coal get down into the pipe. Now, grasp the tap by the square end made for the reception of the wrench (in no case must it be held by the threaded end in the tongs), and as you see that the pipe is red hot insert the tap, and by turning the tongs keep the tap slowly revolving in the pipe, and when it looks as though it were red hot pull it out and thrust it into a nail-peg or some handy dark corner and see if it is heated all over evenly. This is important. By a little attention you will soon get in the way of noting the cooler portions by their slightly darker color. Repeat these operations until you are sure you have an even, but not a high heat (say a dull red), then plunge the tap point downward into a bucket of clean, soft water, and hold it still until it is as cool as the water. With a few times trying you will find this an easy way to harden a tap or other small tool in a common fire without risk of burning or otherwise injuring the steel. Now, polish the shank and flutes of the tap as before, and by again inserting it into the hot pipe you can easily let down the temper to any degree of hardness required. In the latter case do not have the pipe too hot, as it will make a better tap to let the temper down slowly and evenly.

Economy in the Workshop.

The waste of power, wear and tear of banding, belting and machinery, and consequent faulty product has occasioned much trouble and of late much controversy. The cause of these difficulties are various. Varying weight of machinery on the engine, not regulated by the governor, and unknown to the foreman is the cause of much of the trouble. All this can be remedied by the use of power scales, which will at once detect the power actually required for devising the machinery, or point out the place where undue friction exists, or where gross mistakes have been made by inexperienced interpretation or faulty adjustment. All such errors and hindrances can now be pointed out so plainly that "he who runs may read" and know just what to do to secure the largest and best results from the least power. To this may be added the relative merits of low and high speeds for engines and machinery from the standpoint of economy. Of late the relative merits of low and high speeds for machinery, considered from the standpoint of economy, have frequently been made subjects of grave consideration. There is abundant evidence to prove, however, that no great weight has been thrown on either side, and there is now almost as much diversity in practice as there has been at any time. Of late, there has been a growing tendency to adopt higher speeds than have ordinarily been employed for some purposes; but the advantages thus gained have been confined to only a few, and the low-speed evil remains yet to be conquered. Examples of slow shafting and belt speeds often prevalent in machine shops have frequently given rise to severe criticism. Doubling the speeds now generally used has been advocated in more than one instance, with the promise of satisfactory results, and cases are by no means rare where the idea has been successfully carried out. With increased attention to the waste of power entailed by improper arrangements of shafting and belts, the important function of speed will gain fuller recognition, and power users will then begin to appreciate the extent of the losses that they have suffered.

SOAKING PITS FOR TIRES.—The Osnabruck Steel Works are making use of "soaking pits" for the slow and uniform cooling of the tires after rolling. The pits are constructed in the ground, in the usual manner, of firebrick material, and are of such a size that they hold 12 tires, one placed on top of the other. The tires

are taken to the pits directly; they are rolled by means of traveling cranes, and are left to cool for three or four days in the closed pits. Experiments have proved that tires cooled in this way have 50 per cent greater strength than those cooled in the usual way, in ashco, or simply exposed to the air.

THE SPEECH OF THE EYES.—Professor Hugu Maguass recently delivered in Berlin a lecture on "The Speech of the Eyes." First he showed how various thoughts and emotions may find their expression through the eyes, how rage, joy, sadness, sympathy, all may be indicated by one look, and how a question may be asked or he replied to simply by one scarcely observable movement of the eye. But the most interesting part of his lecture was, says the *Medical and Surgical Reporter*, a point with which many a physician may not be acquainted, not from ignorance, but simply because he has never given the subject any thought, viz., the fact that the various expressions of which the eye is capable are not at all made by the eye itself, i. e., by the eyeball, but by the movements of neighboring parts. The eye itself may be stationary, not the least motion may be observed in it, and yet the raising of the lids expresses our surprise, half-closing them together with contraction of the brow indicates our displeasure, and a peculiar movement of the lids, and the parts around the nose together form what we are in the habit of calling "a merry twinkle." Many a one who will read these lines will at once acknowledge that such is the case, and that the facts are as stated, but at the same time he will acknowledge that he had never thought about it, and had never imagined that as all the manifold expressions which we ascribe to the eye—the mirror of the soul—the eye itself has no share. When a criminal has his character pictured in his eyes, it is not they that tell us the moral depravity of the man, but the play of the neighboring muscles, which, perhaps, for years, always obeying the impulse from the brain form together the group we call physiognomy.

ARE WE OBLIGED TO GO ABROAD FOR OUR WIRE ROPE?—In the report of W. S. Schley, of the Navy Department, addressed to the Secretary of the Navy, Oct. 16, 1885, this statement appears: "The Bureau has been obliged to purchase abroad the steel-wire rope for the new cruisers on account of its inability to have wire of the necessary tensile strength, elastic range and ductility manufactured in the United States. A contract was entered into during the year with a firm in Massachusetts, but after several failures had been made the Bureau was obliged to discontinue the contract. Rope manufactured abroad and delivered at the New York navy-yard costs about 60 per cent less than the lowest offer received for the wire alone in this country." Present appearances seem to indicate that the cost of strikes, lock-outs, high wages, etc., all of which the workmen eventually have to pay for, will soon render it necessary to go to Europe for the bulk of our iron and many other goods, while our own workmen are left to suffer in the midst of what might be plenty and prosperity.

THE STEEL QUESTION.—The opinion is freely expressed in British iron circles that the new works which are being erected for the manufacture of mild steel in England, will overdo the work fully as much so as has already been done in the case of Bessemer steel. Especially is this the case, in view of the indication that ship and boiler builders will, for some time to come, look to Siemens' steel as the most valuable and reliable material for their use. It is generally held that Scotch steel "is the best in the world for all purposes requiring strength and ductility." Indications might, however, be adduced, that even "the best steel in the world" is not always wholly reliable. Still, it is undeniable that the general reliability of open-hearth steel has largely contributed to the recent extraordinary development of modern engineering and general construction, and that the development will continue to the advantage of the mild steel makers.

DISINCRUSTING BOILERS.—The latest method of disincrusting boilers patented in Germany, claims to be free from chemicals and to require no supervision, thus being costless. The feed-water is forced through one of the usual feed contrivances into the steam dome, in which it is mixed by a jet of steam entering concentrically in order that it may during the mixing be cast violently against the cover of the dome. The effect of this movement is that all the water receives the full temperature of the surrounding steam. By this sudden heating (to 150–180° Cel.) air and carbonic acid are withdrawn from the water, and not only the carbonate of lime, but also the sulphate of lime and magnesium are extracted, and the precipitate occasioned is periodically removed.

IRON NOW AND THEN.—It is often observed that iron of recent make rusts and wears away much more rapidly than samples made forty or fifty years ago. The observation is not illusive and the reason of the more rapid deterioration of much of the iron of a late make arises from the fact that it contains more impurities than formerly. The common iron of to-day is filled with slag, and looks coarse and fibrous when rusted or worn. Fifty years ago the iron made in the United States was largely charcoal iron, and was much purer and better than the same grades made at the present day.

SCIENTIFIC PROGRESS.

A Peculiar Illumination.

A brilliant phenomenon has been noticed at Beaver Falls and other places in Western Pennsylvania, where natural gas blow-off pipes send out their large volumes of flame into the frosty night air, which has aroused particular interest both from its beauty and the absence of any fully satisfactory explanation.

At those works which receive their supply of natural gas directly from a well, and are running only during the daytime, the gas is permitted to escape into the atmosphere at night, and to avoid the roaring sound is usually ignited as it issues from the top of the blow-off. These gigantic torches light up the country for miles around, the effect being particularly noticeable in cloudy weather, when the glare is reflected. It has been observed that in certain conditions of the atmosphere a vertical, feathery and very brilliant arrow of fire extends above the flame almost to the zenith. Its greatest brilliance is perhaps at its highest point, where it is described as being quite as bright as a rod of iron at a white heat. The natural pulsations of the gas, as it rushes from the blow-off, affect the outpouring flame, and give the luminous arrow a leaping, flashing motion which adds greatly to its beauty. The observers agree in stating—and the fact is significant—that the conditions necessary for the appearance of the phenomenon depend upon the presence of a frosty atmosphere and an appreciable haziness, or else it is visible either during or immediately preceding a light, fleecy fall of snow, the temperature being somewhat below the freezing point.

Bearing these facts in mind, it is not difficult to explain the arrow. The minute crystalline faces of the suspended snow or ice particles catch the light from the burning torch, and reflect the rays in precisely the same manner as the ocean, or other expanse of water, on a moonlight night, gives us a long, silvery path of reflected moonbeams. This explanation finds further confirmation in the fact that the arrow extends only to the upper limits of the haze, and when the lower atmosphere is clear, begins at some distance above the flame.—*Scientific American*.

FLUID EXTRACT OF CAMELLIA.—Within the space of a few months, Dr. E. R. Squibb has called the attention of the medical profession to the fluid extract of camellia, or tea, which has been thus proposed to take the place of guarana and cocoa. He states that the testimony in regard to the effect of tea, coffee, Paraguay tea and kola nuts is all of a similar character to that given with regard to cocoa. Each of these substances appears to have come into use independently in widely separated countries, in order to produce the same effects, namely, to refresh, renew, or sustain the physical and mental organism; and it is a curious surprise to find that after they had been in use for a very lengthened period, and although each came from a different order of plants, the same active principle, namely, *caffeine*, could be extracted, in different proportions, from all of them. It is even more curious to find that for centuries past a plant called cocoa, yielding a different principle, has been in use for a similar purpose, the effects of which, says Dr. Squibb, differ but little from *caffeine*, "simply producing a similar physiological effect in much smaller doses." Comparing the power of these drugs in their tendency to counteract sleep, or promote wakefulness, the author found that three grains of *caffeine* were equal to three fluid drachms of the extract of cocoa and to seventy minims of the fluid extract of camellia. These seventy minims of the latter extract equal seventy grains of tea, and this yields a little over two grains of *caffeine*. These are Dr. Squibb's figures. Later, Dr. J. B. Andrews has reported on a long series of experiments with fluid extract of camellia and hydrobromate of hyosine in the treatment of insane patients.

PULVERIZED STEATITE.—As a finish or covering for walls and ceilings pulverized steatite is coming into use quite satisfactory. It is simply soapstone. It takes a high polish, is pearl gray in tint, is said to present the best possible surface for painting, either in oil or water color, and, what is very desirable, will neither crack nor chip. It is claimed for it that it is a non-conductor and non-absorbent; that it can be washed without injury; nails can be driven into it without damage; when subject to heat, moisture and chemical fumes it gives no smell; and it does not turn yellow with age. It is thought to be specially adapted for hospitals, factories, cellars, markets, etc.

MOTION AT REST.—One of the most astonishing of the many wonderful powers of the photographic instrument—our artificial eye—is the extreme rapidity at which it acts upon objects brought within its range. *Popular Science Monthly* makes the following reference to this power: We will suppose that everything is in readiness, that its retina or sensitive plate is in perfect condition, and that not a ray of light has yet entered within the darkened chamber. Instead of being "the twinkling of an eye," we shall arrange so that the time elapsing between the opening and closing of the artificial eye lid shall be less than one-thirtieth of a second, or far less than the time

necessary for our eyes to "open and shut." It shall be as nearly "instantaneous" as possible. Everything is ready. Click! It has opened and shut. What has it seen in that little instant of time? If anything is in motion, it has been perceived in that fragment of a second as motionless. Men walking along the street are pictured with uplifted feet. A trotting horse may be caught with all of its four legs in the air, viewed just at the moment when he was clear of the ground. A man leaping with a high pole may be pictured in midair, precisely in the position in which he appears at the highest altitude. Motion seems rest. But this even is not the most wonderful of its powers. Far beyond the keenest of human vision is its range of sight. If the light is good this sensitive plate of glass will have recorded and discerned a thousand uplifted faces as perfectly as the human eye perceives the features of a single countenance. Every expression of joy or sorrow, every peculiarity of dress or attitude, the leaves of a forest, or the grass by the wayside, will have been seen and delineated and retained perfectly in far less than the briefest possible twinkling of a human eye.

BOTANICAL INSTRUCTION IN THIS COUNTRY.—By a slow evolutionary process, botanical instruction appears to be undergoing a radical change in the United States, which concerns both its nature and methods. Whereas only a few years ago botany, as a college study, dealt chiefly with the flowering plants and vascular cryptogams, its scope has broadened, even in the limited undergraduate curriculum, so that the graduate of to-day is supposed to have been taught more or less about each of the principal groups of plants, from the lowest to the highest, if he has studied botany at all. With this change has come an earnest effort to make his knowledge a working knowledge, obtained in the laboratory so far as essentials are concerned and merely rounded out in the lecture-room. That Harvard University should be prominent in planning and introducing these changes is not surprising, for nowhere has botanical research and instruction been so favored in the the possession of the necessary means and of talented leaders in different branches of the growing subject.—*Science*.

COMBUSTION OF COPPER AND NITROGEN.—A curious phenomenon has been observed by M. Blondlot and communicated to the French Academy of Sciences. A disk of platinum and a disk of copper were fixed vertically in front of each other by help of two millimeter stands. The disks were three or four millimeters apart, and both were placed inside a bell jar of porcelain open below. The apparatus was then heated red hot for this process by means of a gas furnace, and although there was no electric current, it was found that the face of the platinum disk was blackened with a deposit containing copper and platinum. In short the copper had crossed to the platinum plate from the copper one. M. Blondlot by repeating the experiment in different kinds of gas found that the nitrogen of the air was the agent in this transport of matter. The nitrogen combines with the copper and lodges on the platinum, either incorporating itself with the latter or decomposing in contact with it under the influence of its high temperature.

ORIGIN OF THE ZODIAC.—The Egyptian zodiac, says Mr. Boscawen, which had furnished the French astronomer Arago with so much material by which to prove the Egyptian source of the zodiac, was now known to have only a Ptolemaic age, and still later came the zodiac discovered at Tanis, the ancient Zoan by Mr. Flinders Petrie. The numerous engraved gems and the carved stones, especially the valuable boundary stones, of a far more remote antiquity showed that the signs of the zodiac as known to us were known also to the Chaldeans. It is evident that from an early period the division of the heavens into twelve parts, presided over by twelve constellations, had been in use among the Babylonians.

DISCOVERY OF A NEW NEBULA BY PHOTOGRAPHY.—MM. Paul and Prosper Henry have recently announced the discovery by means of photography of a new nebula in the Pleiades. It was first photographed on November 16th last, and though it was again photographed on December 8th and 9th, MM. Henry have not yet detected it by direct telescopic observation. The nebula is about 3' in extent and "tres-intense." It presents a well marked spiral form, and seems just to escape Maia. Its position is as follows: R. A. 3h. 38 m. 57 s., Decl. 24° 1' N. The question is sometimes asked, which is the most sensitive to light—the human eye or the photographic plate? This discovery seems to indicate the superior sensibility of the chemical plate.

THE MAXIM GUN.—This new and wonderful weapon is a gun weighing only 65 pounds, mounted upon a light tripod, which can be lowered, raised, moved literally with one hand as easily as a garden hose, and which pours out automatically 600 shots a minute. There is no crank to turn; there is no labor of feeding. One man simply acts the bullets going and then directs it at will, raking a whole regiment front if he likes or keeping the fire within a range of five feet or five inches. The basis of it all is the utilization of the recoil force to fire the next shot.



A. T. DEWEY.

W. B. EWER.

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Passing Events.

The streams of the country are all very high now, and where the miners are allowed to work their gravel they have plenty of water. The water season this year will be a very good one, there being an abundance of snow stored in the mountains.

Southern Oregon mines are now attracting more attention than ever before. Many miners are at work there, and apparently doing well. The Oregon mining fields will be well prospect this year.

Idaho, too, is looking up again in her mining interests. Capital seems to be going into the Territory and helping the miners out, much to the advantage of many of the camps.

The low freights and fares between here and the East continue, and thousands of people are now visiting California. There will be more tourists in the State this summer than we ever had before in one season.

A custom smelter has started to work near Tombstone, and is a thorough success. Similar works will probably be started. The miners are very cheerful over the prospect of a return to lively times.

EXTRA EDITION.—We shall print a double sheet edition of the MINING AND SCIENTIFIC PRESS next week, containing much matter of general and special interest.

Hoisting Cables.

It was found by the census officials that out of 420 deep mines in the United States, 38 used flat steel cables, 171 round steel cables, 8 both flat and round steel cables, 180 used hemp or manila rope, and 17 both steel and hemp rope. In this State 42 out of 65 used round steel rope. In Nevada out of 73 deep mines, 27 used flat steel rope, 25 round steel, and 14 hemp or manila, while 7 used both metal and hemp. The manila or hemp ropes are used only in comparatively shallow workings and where moderate quantities of ore are raised. The largest reported in the State of Nevada was three inches in diameter, and raised an average load of 2,200 pounds, including weight of cage. The smallest was 1½ inches in diameter and raised but 250 pounds. Hemp and manila cables last from 3 to 18 months, and average from 10 to 12 months.

A few mines use round tapered steel cables. The tapered cables are 2½ inches at top and 1½ inches at bottom. While so far as the distribution of the load is concerned, tapered cables present a decided advantage; they are much less readily repaired, and cannot be reversed. They were much more used a few years ago than they are now.

A dozen or so years ago steel cables were introduced but slowly. Though their advantage was great they were apt to give out unexpectedly and without warning. The difficulties of making a steel wire suitable for the purpose have been overcome, and there are now but few iron cables left. For large cables the flat is preferred to the round. A heavy round cable must be wound on an enormous drum to escape injury by bending, while the flat rope can go on a reel of small width, and of no greater diameter than would be used for round. These advantages more than counterbalance the slight additional weight of metal necessary to obtain the same strength as the round cable would possess. The largest steel cable reported was one on the Comstock, ¾ of an inch thick and 8 inches broad, carrying a load of 15,800 pounds. The average load for steel wire ropes, except in Nevada, is a ton and a quarter, but on the Comstock it is about three tons.

The following is a partial list of Comstock hoisting cables, showing weight of load, average duration, particulars as to sheaves, etc., and will be of interest to all mining men:

Belcher.—Flat steel wire cables, 4 in vertical shaft, each 1,000 feet long, 3½ inches by ½ inch; 2 in incline, each 2,000 feet long, 5 inches by ½ inch. Average load, including cage, 5,300 pounds. Average duration, with repairs, 3 years. Sheaves, 50 feet high, 7 feet in diameter.

Belcher and Crown Point Pump Shaft.—In hoisting compartment, flat steel wire cable, 5 inches by ½ inch, 5,300 feet long; in pump compartment, round steel wire cable, 1 inch in diameter, 1,000 feet long. Average load, including cage, 5 tons. Average duration, with repairs, 4 years. Height of sheaves, 30 feet; diameter, 6 feet.

Crown Point.—Five flat steel wire cables, 5 inches by ½ inch; one round steel wire cable in incline, tapering from 2½ inches to 1½ inches in diameter. Average load, including cage, 5,500 pounds. Average duration, with repairs, 4 years. Height of sheaves, 18 feet; diameter, 7 feet.

Forman Shaft.—Two flat steel wire cables, one English make and one American, each 3,000 feet long, 6 inches by ½ inch. Average load, including cage, 5 tons. Height of sheaves, 50 feet; diameter, 10 feet.

Overman.—Flat steel wire cables, one 5 inches by ½ inch, 1,700 feet long; one 4½ inches by ½ inch, 1,700 feet long; two 4 inches by ½ inch, 350 feet long. Average load, including cage, 4,700 pounds.

Yellow Jacket.—Flat steel wire cables, each 3,700 feet long; two hoisting compartment cables 8 inches by ½ inch; pump compartment cable 6 inches by ½ inch. Average load hoisted, including cage, 15,800 pounds. Large double-decked cages, with space for two cars on each floor, weighing 5,000 pounds; weight of four cars, 900 pounds each, 3,600 pounds; weight of four car loads, 1,800 pounds each, 7,200 pounds. Without meuding, cables lasted 3 years. Height of sheaves to centers, 55 feet; diameter, 15, 12 and 7 feet.

Combination Shaft (Chollar, Hale & Norcross, Potosi and Savage).—Flat steel wire cables, 6 inches by ½ inch. Average load, including cage, 5,500 pounds. Average duration, 14 months. Height of sheaves, 50 feet; diameter 18 feet.

Consolidated Virginia and California Joint Shaft.—Flat steel wire cables; two in hoisting compartments, 7 inches by ½ inch; one in pump compartment, 5½ inches by ½ inch. Average load, including cage, 12,400 pounds. Three-decker cages, weighing 4,000 pounds; three cars, 1,200 pounds each, 3,600 pounds; three car loads, 1,600 pounds each, 4,800 pounds.

Average duration, 18 months. Height of sheaves, 45 feet; diameter of hoisting-compartment sheaves, 11 feet; diameter of pump-compartment sheave, 6 feet.

Hale & Norcross.—Flat steel wire cables, 5 inches by ½ inch. Average load in vertical shaft, including cage, 3,000 pounds; in incline, including giraffe, 5,500 pounds. Height of sheaves, 36 feet; diameter, 8 feet. Incline cable lasts only 6 months.

Ophir.—Two flat steel wire cables, 5 inches by ½ inch, in vertical shaft; round steel wire cable in incline, tapering from 2½ inches to 2 inches. Average load, including cage, 8,600 pounds. Weight of double-decked cages, 3,000 pounds; two cars, 1,200 pounds each, 2,400 pounds; two car loads, 1,600 pounds each, 3,200 pounds. Average duration with repairs, 2 years. Height of sheaves, 30 feet; diameter, 7 feet.

Oshiston Shaft (Best & Belcher and Gould & Curry Joint Shaft).—Two flat steel wire cables, each 2,500 feet long, 5 inches by ½ inch. Average load, including cage, 7,000 pounds. Average duration with repairs, 4 years. Height of sheaves, 30 feet; diameter, 6 feet.

Savage.—Two flat steel wire cables in vertical shaft, each 1,500 feet long, 5½ inches by ½ inch. Round steel wire incline cable, 4,000 feet long, 2½ inches diameter. Average load in vertical shaft, including cage, 3,600 pounds; in incline, including giraffe, 5,000 pounds. Average duration with repairs, 3 years. Height of sheaves, 40 feet; diameter, 6, 8 and 15 feet.

Union Shaft (Mexican, Sierra Nevada and Union Consolidated joint shaft).—Flat steel wire cables; two in hoisting compartments, 7 inches by ½ inch; one in pump compartment, 5½ inches by ½ inch. Average load hoisted, 13,500 pounds, including three-decker cage, 4,500 pounds; three cars, 1,200 pounds each, 3,600 pounds; three car loads, 1,800 pounds each, 5,400 pounds. When hauling, hoist 1,000-gallon iron tank weighing, shell and water, 9,812 pounds. Average duration with repairs, 4 years. Splices are from 75 to 100 feet long. "Cables wear most rapidly at points over sheaves corresponding to distances of stations; the wear is also more rapid when there is an over and under head on reel and sheave." Height of sheaves to center, 45 feet; diameter, 12 feet.

Utah.—Flat steel wire cables; vertical-shaft cables, 4 inches by ½ inch; incline, 6 inches by ½ inch. Average load in vertical shaft, including cage, 3,500 pounds; in incline, including giraffe, 9,000 pounds. Average duration with repairs—vertical shaft, 5 years; in incline, about 2 years. Height of sheaves, 25 feet; diameter, 6 and 8 feet.

On a Better Basis.

When the Cœur d'Alene excitement broke out a few years since, a great many men went to Idaho in hopes of making fortunes, and a very large proportion were disappointed. The inclement winters, the depth of the "diggings," the expense of living and the necessity of capital to properly work the mines, were not properly considered. It was no "poor man's camp," and thousands left the country disgusted. Since then, however, the region has been well prospected, ditches have been built, capital invested in many ways, and now the mines are beginning to be prosperous. It is estimated by those who have visited the region that upwards of a million dollars will be expended there by the several enterprises under way. The weather still retards hydraulic operations, and none of the gravel prospectors are at work yet, though all are getting ready.

The quartz mines of Cœur d'Alene are attracting more and more attention. A ten-stamp mill has been running for a year near Murray, where there are several quartz enterprises. At the mine of the Idaho Company, of Louisville, they are putting up a 20-stamp mill, built by the Union Iron Works, of this city. The Golden King Company, also of Louisville, Ky., are putting up another 20-stamp mill. The New York company, which expended \$75,000 last year on a bed-rock flume, have re-organized and started up operations this month. Murray, the principal town, has 1200 inhabitants, and the whole region, which many people thought would be a failure, is likely to be prosperous for a long time.

The Helena Concentrating Company, recently incorporated, contemplate the erection of works for concentrating, milling and smelting ores in Shoshone county, Idaho. The erection of works will be at once commenced at Kentucky, a small town about 28 miles from Murray, the center of the Cœur d'Alene mining region, and ten miles from the head of navigation on Cœur d'Alene river. The first of June next will see the works in operation, with a daily capacity of fifty tons. The site for the works is well chosen, as the country on all sides is rich in quartz mines, whose product can be brought to Kentucky by easy and practicable routes. The place is also easy of access

from the outside world by a route from Rathdrum, on the Northern Pacific Railroad, involving 20 miles of staging and 60 miles of steamboating up the Cœur d'Alene lake and river. Thus the works will be so situated that they will lay tributary to the wealthy mines of the Cœur d'Alene country, and command an easy and always practicable outlet for the hullion and concentrates they produce. The new company has already secured a contract from J. F. Wardner & Co. for concentrating 50,000 tons of ore from the Cœur d'Alene mines—a work that will keep their plant busy for two years after its completion. Moreover, the representatives of smelting works at Butte have contracted with several miners on the South Fork for all the ore they can furnish up to 50,000 tons. Four thousand tons are sacked at dumps, and 135 tons are at Kingston. Upon this quantity \$7,000 was advanced. The ore is carried 16 miles to Old Mission, 60 miles by steamer on lake and river, and 11 miles from the lake to Rathdrum. A contract has been made with the steamboat, and Major Manning has examined into the matter with a view of contracting for the transportation between the lake and Rathdrum. The price paid for ore at the mines is \$10 per ton; estimated cost of transportation to Rathdrum is \$27 per ton. From these statements it will be seen that the Cœur d'Alene mines are as likely to be important for quartz as for placers, and that there is a great future for the camp.

Foundry Notes.

Quick Work on Pumping Machinery.

A large mining pump was shipped to the Alaska mine, Sierra county, on Thursday, by the Dow Steam Pump Works. The contract was made last week and it was agreed to have the pump completed in eight days, though from 30 to 60 is the usual time required for such a job. The pump is of special size, and at the time the contract was made there were no drawings even. The drawings were made, patterns made, and castings and machine work finished so that the pump was finished and tested, and shipped on the eighth day. The men worked night and day to complete the job as it was a case of urgency, the water having drowned out the other pumps at the mine.

The new pump is a vertical-working shaft pump, to be suspended in the shaft. It weighs 5500 pounds, and the capacity is 600 gallons per minute. The type is well known, but this size was large and there were no patterns ready for it. The steam cylinder is 16 inches, buckets 14 inches, plunger 10 inches, and stroke 24 inches. The pump is fitted with the improved suction condenser, which improves the economy of the pump and at the same time does away with the nuisance of the exhaust in the shaft.

The pump will go in the shaft, where there are several others, which have not been able to cope with the water. The Alaska is a very wet mine, and it is said a stream of 90 inches has at present to be contended with. When the shaft is once dry again, larger station pumps will probably be put in.

This style of sinking pump is getting to be quite popular and numbers are being made of smaller size than the one just built. The Dow Works are now building one for I. E. James, to go to Southern California. Mr. Dow is making an effort to get the works in such a shape that he can at any time turn out pumping machinery at very short notice, and this is an instance of what can be done in an emergency. Oftentimes very short notice is given and people often huy from Eastern builders in order to get their work quickly, and occasionally get things not specially adapted for their wants. The pumping plants made here for mining work have been devised with special adaptations to the needs on this coast, and are very efficient. This new pump is not a stationary one, but is made to go in a small shaft so as to be readily lowered and handled. The Dow Pump Works already make more of a variety of pumps than Eastern manufacturers, and others are to be added.

Work is being resumed on a number of mines in Columbus district, Candelaria, that have been shut down for a number of years.

The Trinity county placer miners are clearing up after having a good season's run, and Weaverly is lively in consequence.

Legendary Lore of the Pueblo Indians.

Existence of a Secret Order.

As the aborigines of this continent gradually decrease in number, and the advance of civilization drives them from their homes, the ethnologist increases his efforts to preserve their histories and traditions and the records of their manners and customs. The tribes which have inherited the lands of the western coast of North America have left on the rocks their picture writings and carved records, many of which are now undecipherable. Others, again, are susceptible of translation, and much interest is taken in the meaning of these records. A short time since we gave an article on "Pre-historic Printing," in which was shown one of the pictured rocks in Nevada. The perusal of that article reminded Mr. James H. Crossman, of this city, of almost forgotten notes which he has had in his possession for some years. Colonel W. T. Robinson (who resided for a number of years with the Moquis and Zunis, in Northeastern Arizona) furnished the data to Mr. Crossman for the following notes:

The colonel acquired their language and learned much of their traditional lore, which the father of a family invariably imparts to the eldest male born child to be retransmitted. The Moquis and Zunis have undoubtedly the same origin, though distinct in tribal relations and seldom intermarrying. They differ from the ordinary North American Indian in being larger and lighter colored. They are semi-civilized; are agricultural and pastoral, house dwellers and live in communities. Their government is administered by two departments—Church and State—each independent of the other. The head man, or "big chief," is the temporal adviser and ruler. The "medicine man" attends to their spiritual requirements, and is believed to be all powerful with the deities (gods) of the spirit land. They believe in good spirits and bad, the latter predominating and being the most feared. They claim that the country from whence they originated was the cradle of the earth, and their hieroglyphic writing as interpreted by them refers to other lands beyond the "big waters" (the ocean) as the home of their ancestors. They with their families embarked on "big rafts" (ships or sailing vessels). Violent storms were encountered, driving them from their course, and they landed in a strange country and met savage men and strange animals, many of mammoth proportions. The country was covered with vegetation. They settled on these lands, and in time became a numerous and prosperous people. But their more warlike neighbors, the aborigines of the country, became envious of their success, made war on them, and conquered and drove them southward and away from their homes.

Lieut. Cushing, in the employ of the U. S. Government, also resided with these Indians quite a while, and has minutely described in his report their habits, manners and customs, and much else relating to these interesting

people. He thinks that they are undoubtedly the degenerated remnants of a prehistoric civilization. The lieutenant, however, though a close observer and a student, was evidently not *en rapport* with the tribal "medicine man." He was not a member of their secret organization, a species of Masonry, as he wholly omitted or failed in getting the following bit of legendary lore, which was gleaned by Col. Robinson, from time to time, during his long sojourn with these people:

They have a secret Order, using passwords, signs and grips, in many respects resembling the Masonic. This Order consists of 12 degrees. The symbolic emblems of the several

water," that scientists would be glad to know. The colonel stated that it required great powers of endurance and a determined will to successfully pass the ordeal, in taking these dogroes as the least sign of fear or flinching on the part of the candidate, disgraced him in the eyes of the brethren, and was a bar to his passing for the period of 12 moons (months), when he could again be proposed. The colonel also stated that the grips, signs, fire signals and passwords were also recognized by other Indian tribes that he passed through, proving that the Order, like the Masonic, with our race has branches or lodges probably extending to all the Indian tribes on the North American conti-

turn to the sun, her former home, and left her children in care of a bear of the feminine persuasion, who raised them. The Indian method of recording this is shown in numbers 4, 18, 12, 17 and 19.

The hieroglyphic chart also represents the more modern history of these people: their wanderings from place to place since their expulsion from their first settlement on the North American continent to their present abode, and is probably, though rudely drawn, a true pictorial history of incidents that have occurred.

The zigzag lines (Fig. 1) represent their flight over and across the mountain ranges from north to south, halting and settling at a point near the river Puorco, and known as the petrified forests of Arizona (See Fig. 2.) From here their legends state that they were driven by a flood, covering and inundating the whole country, causing great loss of life. The remnant of the tribe migrated northerly to the Canyon De Shalely (see Fig. 3), where they formed a settlement, and again were prosperous and happy for a long term of years, when suddenly and without warning the whole country was shaken and disturbed by violent earthquakes and volcanic eruptions, covering the face of the country far and near with hot ashes and molten lava, rendering it unfit to support animal life. They fled with terror to Wallapai (see Fig. 5) and a portion of the tribes to the mesas (Fig. 13), where they have lived for some 500 years, or 200 years previous to the advent of the Jesuit Fathers, which occurred 300 years ago (see Fig. 15). The advance guard of this religious sect consisted of five missionaries. The result was the introduction of a new order of things, such as strange gods to worship, a church surmounted by a cross, etc. The tolling of a bell was for the first time heard calling them to their devotional exercises. This state of affairs continued for a period of seven years, when the natives rebelled at the innovation. They refused to bear the Christian yoke longer, and threw the spiritual fathers, the Jesuits, over the cliffs. The cross and bell is all



ROCK CARVINGS SHOWING RECORDS OF PUEBLO INDIANS.

degrees are illustrated in the hieroglyphic chart annexed (see Figs. 6, 7, 8, 9, 10, 11, 12, 14, 16, 17, 18, 20), which was faithfully copied by Col. Robinson, from figures cut large and deep in a sandstone cliff in the celebrated petrified forests of Northeastern Arizona. The colonel during his stay became a member of the Order and learned their secrets, which he dares not impart, for death is the penalty for divulging them. The colonel took all the degrees of this Order but one, the "Sun God," which is the highest and last, where is kept the most sacred secrets of the tribe. Previous to being admitted to the Sun God degree it is necessary for the candidate to pass many years of probation, and is seldom admitted under the age of 50. It will be noticed that the number of the degrees compare with the months in the year and the signs of the Zodiac, and it is possible that this Order, with its arbitrary and mythical signs, may possess secrets of their former home beyond "the big

nent. The wild turkey and bear are deified and sacred animals. They never kill or eat them. These Indians believe that as soon as a squaw dies the spirit enters the body of a newly hatched turkey—"squaw turkey" or "turkey squaw" (see Fig. 16).

Fig. 4 also illustrates the history and birthplace and origin of man on earth. The legend teaches that:

A goddess from the sun in her wanderings visited the earth, which was inhabited only by animals and birds. The turkey was dispatched to summon its inhabitants to meet and welcome the feminine deity. She coquetted with each in turn, but finally became enamoured with the badger, and dispatched the remainder of the animals to gather food and kill game for the marriage feast. They were married, and in due time she gave birth to three children, representing three races of men—white, copper-colored and black. Having accomplished her object in peopling the earth, she decided to re-

turn to the sun, her former home, and left her children in care of a bear of the feminine persuasion, who raised them.

The following is the key to the hieroglyphic chart:

- 1.—Represents the zigzag road taken by the Zunis and Moquis crossing the mountain ranges fleeing from their pursuers.
- 2.—Their 2d settlement at the Petrified Forests.
- 3.—Canyon De Shalely: their 3d settlement.
- 4.—Birthplace or cradle of man (Garden of Eden).
- 5.—Wallapai: their 4th settlement.
- 6.—Rain God (Ajen, a secret order), 1st degree.
- 7.—Snake God, 2d degree.
- 8.—Coyote God, 3d degree.
- 9.—Snow God, 4th degree.
- 10.—Snake God, 5th degree.
- 11.—Badger God (father of man), 6th degree.
- 12.—Bear God (foster father of man), 7th degree.
- 13.—Mesa, present home of the Moquis.
- 14.—War God, 8th degree.
- 15.—Advent of Jesuit Fathers.
- 16.—Turkey Squaw, 9th degree.
- 17.—Sun God, 12th and last degree.
- 18.—The Goddess from the Sun, mother of man, 11th degree.
- 19.—The three children of the Goddess or first inhabitants on earth.
- 20.—Peace God, 10th degree.

HELENA capitalists are about to erect smelting works at Murray, Idaho.

PRACTICAL HYDRAULICS.*

NUMBER 25. COPYRIGHTED.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

TABLE 27.
Flow of Water per Second in Open Streams, the Coefficient of Roughness of whose beds is $n=.035$.

Hydraulic Mean Depth, p .	$F=3.00$, Velocity, Feet.	$F=4.00$, Velocity, Feet.	$F=5.00$, Velocity, Feet.	$F=6.00$, Velocity, Feet.	$F=7.00$, Velocity, Feet.	$F=8.00$, Velocity, Feet.	$F=9.00$, Velocity, Feet.	$F=10.00$, Velocity, Feet.
.25	.3071	.2204	.3503	.3700	.4562	.5163	.8401	1.190
.3	.3603	.2855	.4108	.4339	.5345	.6101	.9843	1.395
.4	.4021	.3245	.4560	.4811	.5932	.6797	1.1259	1.784
.5	.4350	.3542	.4938	.5200	.6352	.7273	1.2155	2.155
.6	.4617	.3783	.5238	.5511	.6692	.7652	1.3115	2.507
.7	.4820	.3957	.5471	.5755	.6872	.7873	1.4040	2.846
.8	.5000	.4111	.5689	.5983	.7143	.8173	1.4930	3.173
.9	.5161	.4255	.5883	.6187	.7383	.8433	1.5780	3.488
1.0	.5311	.4395	.6067	.6381	.7600	.8673	1.6600	3.797
1.25	.5820	.4777	.6600	.6925	.8200	.9300	1.8750	4.629
1.5	.6240	.5167	.7067	.7400	.8733	.9867	2.0833	5.221
2.0	.6800	.5667	.7733	.8067	.9400	1.0600	2.2667	6.062
2.5	.7200	.6067	.8200	.8533	.9867	1.1067	2.4333	6.782
3.0	.7500	.6333	.8533	.8867	1.0133	1.1333	2.5667	7.430
3.5	.7733	.6556	.8778	.9111	1.0367	1.1567	2.6833	7.997
4.0	.7978	.6778	.8999	.9333	1.0600	1.1800	2.8000	8.583
4.5	.8167	.6967	.9189	.9522	1.0800	1.2000	2.9000	9.183
5.0	.8333	.7143	.9356	.9689	1.1000	1.2200	3.0000	9.797
5.5	.8489	.7300	.9500	.9833	1.1167	1.2367	3.0933	10.421
6.0	.8633	.7444	.9633	.9967	1.1300	1.2500	3.1833	11.055
6.5	.8767	.7578	.9756	1.0089	1.1433	1.2633	3.2667	11.697
7.0	.8889	.7700	.9867	1.0200	1.1556	1.2756	3.3500	12.347
7.5	.9000	.7811	.9967	1.0311	1.1667	1.2867	3.4333	12.997
8.0	.9111	.7922	1.0067	1.0411	1.1778	1.2978	3.5167	13.647
8.5	.9211	.8022	1.0167	1.0511	1.1889	1.3089	3.5978	14.297
9.0	.9311	.8122	1.0267	1.0611	1.1989	1.3189	3.6778	14.947
9.5	.9400	.8222	1.0367	1.0711	1.2089	1.3289	3.7567	15.597
10.0	.9489	.8322	1.0467	1.0811	1.2189	1.3389	3.8333	16.247

Cal.—Find in Table 28, under semi-hexagon in depth column, 3 feet, opposite which, in area column, is found 15.588 square feet, and in hydraulic mean depth column 1.5.


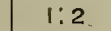
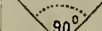

Turning now to Table 27, for $n=.025$, find in hydraulic mean depth column 1.5, opposite which, in velocity column for the given fall, $F=5.28$ feet, will be found the velocity sought, viz:

$v=2.383$ feet.

Then $q=15.588 \times 2.383=37.15$ cubic feet.—Ans.

TABLE 28.

Dimensions of Water Ways Corresponding to Their Given Hydraulic Mean Depths.

Hydraulic Mean Depth $y = \frac{d}{4}$									
	Side. Feet.	Area. Sq. Ft.	D'pth. Ft.	Width Ft.	Area. Sq. Ft.	Side. Feet.	Area. Sq. Ft.	Diam't'r Feet.	Area. Sq. Ft.
.25	.75	.563	.5	1.0	.5	1.	.5	1.	.393
.3	.9	.81	.6	1.2	.72	1.2	.72	1.2	.565
.4	1.2	1.44	.8	1.6	1.28	1.6	1.28	1.6	1.005
.5	1.5	2.25	1.0	2.0	2.0	2.0	2.00	2.	1.571
.6	1.8	3.24	1.2	2.4	2.88	2.4	2.88	2.4	2.262
.7	2.1	4.41	1.4	2.8	3.92	2.8	3.92	2.8	3.079
.8	2.4	5.76	1.6	3.2	5.12	3.2	5.12	3.2	4.021
.9	2.7	7.29	1.8	3.6	6.48	3.6	6.48	3.6	5.089
1.	3.	9.00	2.0	4.0	8.00	4.	8.00	4.	6.283
1.25	3.75	14.06	2.5	5.0	12.5	5.	12.5	5.	9.818
1.5	4.5	20.25	3.0	6.0	18.0	6.	18.0	6.	14.137
2.0	6.	36.	4.0	8.0	32.0	8.	32.0	8.	25.133
2.5	7.5	56.25	5.0	10.0	50.0	10.	50.0	10.	39.27
3.	9.	81.	6.0	12.0	72.0	12.	72.0	12.	56.549
3.5	10.5	110.25	7.0	14.0	98.0	14.	98.	14.	76.696
4.	12.	144.00	8.	16.0	128.	16.	128.	16.	100.53
4.5	13.5	182.25	9.	18.0	162.	18.	162.	18.	127.23
5.	15.	225.00	10.	20.0	200.	20.	200.	20.	157.08
5.5	16.5	272.25	11.	22.0	242.	22.	242.	22.	190.07
6.	18.	324.00	12.	24.0	288.	24.	288.	24.	226.2
6.5	19.5	380.25	13.	26.0	338.	26.	338.	26.	265.5
7.	21.	441.00	14.	28.0	392.	28.	392.	28.	307.0
7.5	22.5	506.25	15.	30.0	450.	30.	450.	30.	353.4
8.	24.	576.00	16.	32.0	512.	32.	512.	32.	402.1
9.	27.	729.00	18.	36.0	648.	36.	648.	36.	508.9
10.	30.	900.00	20.	40.0	800.	40.	800.	40.	628.3

Ex. 106.—In a trapezoidal canal (bottom-slope of bank), the angle of slope of bank is 45° , the depth 4.394 feet, the fall per mile $F=7.92$ feet, and the coefficient for roughness of bed $n=.017$ (see Table 26). What is the velocity and what the discharge of water per second?

Cal.—Find in Table 28, under trapezoid, with bank slope of 45° , in depth column, 4.394 feet, the given depth; opposite which, in area column, is found 46.606 square feet, and in hydraulic mean depth column, 2.5.

Turning to Table 27, find in hydraulic mean depth column 2.5, opposite which, in velocity column for

the given fall, $F=7.92$ feet, is found the velocity sought, viz:

$v=6.26$ feet.

Then $q=46.606 \times 6.26=291.75$ cubic feet.—Ans.
Ex. 107.—In a trapezoidal canal, in which the bottom is equal a side, and the ratio of the depth to the base of bank is as 2:1, the depth of water is 2.591 feet, the fall per mile $F=10.56$ feet ($n=.002$) and the coefficient for roughness of bed, $n=.025$ (see Table 26). What, per second, is the velocity and what the discharge?

Side.	Depth.	Area.	Side.	Depth.	Area.	Side.	Depth.	Area.	Side.	Depth.	Area.
10.	10.00	100.00	10.	10.00	100.00	10.	10.00	100.00	10.	10.00	100.00
9.	9.00	81.00	9.	9.00	81.00	9.	9.00	81.00	9.	9.00	81.00
8.	8.00	64.00	8.	8.00	64.00	8.	8.00	64.00	8.	8.00	64.00
7.	7.00	49.00	7.	7.00	49.00	7.	7.00	49.00	7.	7.00	49.00
6.	6.00	36.00	6.	6.00	36.00	6.	6.00	36.00	6.	6.00	36.00
5.	5.00	25.00	5.	5.00	25.00	5.	5.00	25.00	5.	5.00	25.00
4.	4.00	16.00	4.	4.00	16.00	4.	4.00	16.00	4.	4.00	16.00
3.	3.00	9.00	3.	3.00	9.00	3.	3.00	9.00	3.	3.00	9.00
2.	2.00	4.00	2.	2.00	4.00	2.	2.00	4.00	2.	2.00	4.00
1.	1.00	1.00	1.	1.00	1.00	1.	1.00	1.00	1.	1.00	1.00

Cal.—Find in Table 28, under trapezoid 2 on 1, in depth column, the given depth 2.591 feet; opposite which in area column is found 10.86 square feet, and in hydraulic mean depth column 1.25.

Turning now to Table 27 for $n=.025$ find in hydraulic mean depth column 1.25; opposite which in

TABLE 29.

Relations of Depth, Base and Slope of a Bank of a Trapezoidal Canal.

Ratio of Depth to Base.	1	m	$(1+m^2)^{1/2}$	Ratio of Depth to Base.	1	m	$(1+m^2)^{1/2}$
5:1	1	2.000	1.0198	19:4	1	2.105	1.0219
24:5	1	2.083	1.0215	9:2	1	2.222	1.0244
23:6	1	2.074	1.0234	17:4	1	2.253	1.0272
22:5	1	2.078	1.0255	15:4	1	2.267	1.0349
21:5	1	2.081	1.0280	7:2	1	2.286	1.0400
4:1	1	2.500	1.0396	13:4	1	3.077	1.0463
10:5	1	2.232	1.0384	11:4	1	3.036	1.0641
18:5	1	2.278	1.0379	5:2	1	4.000	1.0770
17:5	1	2.241	1.0423	9:4	1	4.444	1.0940
16:5	1	2.215	1.0477	7:4	1	5.714	1.1517
3:1	1	3.333	1.0541	3:2	1	6.007	1.2046
4:5	1	3.571	1.0619	5:4	1	8.000	1.2806
12:5	1	2.384	1.0714	3:4	1	1.333	1.6657
13:5	1	2.467	1.0853	1:2	1	2.000	2.2361
11:5	1	2.445	1.0885	1:4	1	4.000	4.1231
2:1	1	5.000	1.1180	5:2	1	2.500	1.0263
9:5	1	2.556	1.1439	13:8	1	2.727	1.0385
8:5	1	2.625	1.1798	11:8	1	3.000	1.0440
7:5	1	2.714	1.2576	10:8	1	3.750	1.0680
6:5	1	3.833	1.3017	8:8	1	4.286	1.0980
1:1	1	1.000	1.4142	7:8	1	6.000	1.1682
4:5	1	1.250	1.6008	5:3	1	7.500	1.2590
3:5	1	1.500	1.9400	4:3	1	1.500	1.8028
2:5	1	2.500	2.6926	2:3	1	3.000	3.1622
1:5	1	5.000	5.0990	1:3	1	4.750	4.8541
5:24	1	4.800	4.0031	4:19	1	4.600	4.6008
5:23	1	4.600	4.7074	4:18	1	4.250	4.3680
5:22	1	4.400	5.1222	4:17	1	3.750	3.8810
5:21	1	4.200	4.8174	4:16	1	3.500	3.6101
5:19	1	3.800	3.9295	4:14	1	3.250	3.4004
5:18	1	3.600	3.7363	4:13	1	2.750	2.9262
5:17	1	3.400	3.5440	4:11	1	2.500	2.4629
5:16	1	3.200	3.3526	4:9	1	1.750	2.0156
5:14	1	2.800	2.9732	4:7	1	1.500	1.8025
5:13	1	2.600	2.7851	4:6	1	1.000	1.8025
5:12	1	2.400	2.6000	3:4	1	4.007	4.7726
5:11	1	2.200	2.4181	3:13	1	4.333	4.4472
5:9	1	1.800	2.0591	3:11	1	3.066	3.8006
5:8	1	1.600	1.8863	3:10	1	3.333	3.4801
5:7	1	1.400	1.7305	3:8	1	2.667	2.8480
5:6	1	1.200	1.621	3:7	1	2.333	2.5380

velocity column for the given fall $F=10.56$ is found the velocity sought, viz:

$v=2.943$ feet.

Then $q=10.86 \times 2.943=31.96$ cubic feet.—Ans.

Ex. 108.—In a trapezoidal canal, in which the bottom is equal to a side, and the ratio of depth to the base of the bank is as 1:2, the depth of water is 5.543 feet, the fall per mile 1.056 feet, and the coefficient for the roughness of the bed, $n=.035$. (See Table 26). What is the velocity, and what the discharge per second?

Cal.—Find in Table 28, under trapezoid 1 on 2, in depth column the given depth 5.543 feet; opposite which in area column is found 130.04 square feet, and hydraulic mean depth column 3.5. Turning now to Table 27, find in hydraulic mean depth column 3.5; opposite which in velocity column for the given fall $F=1.056$, will be found the velocity sought, viz:

$v=1.392$ feet.

Then $q=130.04 \times 1.392=181.02$ cubic feet.—Ans.
Ex. 109.—The diameter of a semi-circular canal being 8 feet, the fall per mile 26.4 feet, and the coefficient for roughness of bed $n=.012$, (see Table 26). What is the velocity per second and what the discharge?

Cal.—Find in Table 28, under semi-circle, in diameter column 8 feet, the given diameter; opposite which in area column is found 25.133 square feet, and in hydraulic mean depth column, 2.

Turning now to Table 27, find in hydraulic mean depth column 2; opposite which in velocity column for the given fall, $F=26.4$ feet, is found the velocity sought, viz:

$v=14.22$ feet.

Then $q=25.133 \times 14.22=357.39$ cubic feet.—Ans.
Remark.—It will be observed that Table 27, is equally well adapted to finding the flow of water in circular pipes as in semi-circular canals. For the hydraulic mean depth is the same in each. Thus in Example 108, were it required to determine the velocity of water in a circular pipe running full, the only change required in the calculation would be to double the area, whence would occur a corresponding change in the result, as follows:

$357.39 \times 2=714.78$ cubic feet.

In case of foul pipes it will be better to employ Table 27, rather than Table 17, computed for clean iron pipes, the coefficient of roughness for whose walls as shown is $n=.011$.

Ex. 110.—The observed data of a canal are as follows:

Width of bottom, 15 feet.

Depth of water, 4.5 feet.

Ratio of depth to base, 2:5.

Fall per mile, 3.168 feet.

Coefficient of roughness of bed .017.

What is the velocity of flow per second, and what the discharge?

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ENGINEERING NOTES.

Electric Locomotion.

Electric locomotion is evidently regarded abroad with much more interest and attention than has ever been given to it in this country, and promises alone, with a conspicuous lack of practical development, seem there to be the exception rather than the rule. English and German engineers have furnished unmistakable proof of the capabilities of electric systems of propulsion. In view of the progress there effected, the lack of spirit, and perhaps also of merit, in connection with such electric enterprises here appears somewhat remarkable. Evidently there is a serious hitch in electric locomotive engineering in this country, and a successful remedy, which does not seem to be very difficult to find, must be applied to re-awaken public confidence.

We condense the above from an American contemporary, and while admitting the general truthfulness of the comment upon American enterprise in this direction we take pleasure in publishing the following paragraph from the *Electrical Review* in regard to what appears to be a successful inauguration of

An Electric Cable Railroad in Denver.

The first successful attempt at trial trips of the new cable car was made this week in Denver, Colorado, over a portion of the track of the Denver Electric and Cable Railroad Company, on Fifteenth street. The car ran a considerable distance, and at the satisfactory rate of eight miles an hour. A dynamo 20 horse-power furnishes the motive power for the car. Quite a large number of prominent citizens took rides on the car. Prof. S. H. Short, of the Denver University, has worked very hard to make his invention a success, and his efforts seem to be already reaping their reward. The company have hoped to get their cars running in six weeks or a month. The car which is now being used in making trial trips is shaped (and fitted up very much like an ordinary street car, and is fully as handsome in its style and appointments as any street car in Denver. It was made by Woehler Brothers, of Denver. The dynamo and other machinery, which is located in a building near the corner of fifteenth and Tremont streets, and which is used to propel the car, was made by F. M. Davis, of Denver, and all the plant and material used by the company will be of Denver manufacture. Ex-Governor John Evans, W. N. Byers, Rodney Curtis, and other well-known Denver gentlemen, are among the officers and directors of the new company. Some further trips will be made by the car, and large numbers of people will undoubtedly visit Fifteenth street, just below the court-house and between Tremont and Glenarm streets, and inspect the invention and its workings for themselves.

A MAGNIFICENT SEWAGE PROJECT.—An enormous scheme for the disposal of the sewage of London has been projected by Colonel Jones and Mr. Bailey Denton. Canvey Island, in the Thames, not far from its mouth, is a low, flat island of 4500 acres area, which, although containing a few dwellings and a church, lies below the level of high tides, and the water is kept from overflowing it by embankments 10 to 12 feet high. To this island the proposition is to convey the sewage of the metropolis, and after purifying it by lime, which can be procured at small expense from the chalk which crops out on both sides of the river near by, discharge the effluent in the river on the falling tide, the low-water level being 10 to 12 feet below the surface of the island. The solid portion of the sewage will be deposited on the surface and render the soil fertile and productive. If found profitable to do so, the liquid portion of the sewage might be pumped on to the main land over a ridge 200 feet high and 5 miles off, and thence flow by gravity over a territory of 60,000 to 80,000 acres of arable land.—*San. Eng.*

GREAT ENGINEERING IMPROVEMENTS are being effected in Venezuela. The work of building a breakwater at Laguyra on the coast, a few miles from Caracas, is to be commenced at once. The entire breakwater will cost \$40,000,000. Blocks of concrete, weighing 500 tons each, will be laid in the sea. No money will be taken from the public treasury. The London company agrees to accept a certain sum per package for all merchandise going over the breakwater for 99 years.

A VERY skillful piece of engineering in a water tunnel at Riverside, San Bernardino county, came to a finish last week, when the two forces of hands working in from each end of the tunnel met. The tunnel is over 3,000 feet in length, and part of it is a curve, yet so true were the calculations made, that when they met in the center there was not one-fourth of an inch difference in the two divisions.

A CAR SEAT recorder has been invented by Mr. Bywaters, of Paris, Texas, which, located in the middle of the car seat, is so connected by gearing with the car axle that when depressed by the weight of a passenger it will record the number of miles traveled by the vehicle while the seat is so occupied.

LIQUID FUEL is attracting much attention in Europe. The Russian Black Sea Navigation Company is building a large fleet of tank steamers to import petroleum in bulk.

USEFUL INFORMATION.

Use of Sandpaper.

In handling this subject, we expect to tread on the toes of both bosses and workmen. Still, we think a few suggestions will not be amiss. Sandpaper occupies a very important position; and, as it is more frequently used, and in greater quantities, than almost any other single article, it becomes a serious question as to cost. The workmen, if so disposed, can materially reduce or increase the cost by using the paper up thoroughly or only using it half. We have seen some throw the piece away if only the edge was off the paper; others would use the edges and corners and the center is good; and others, again, the center, and leave the corners good. That is a waste. As the paper is given to use, it is immaterial what shape you use it in, so that it has answered its purpose. It does no good to pile it up, or stow it away in a box to be used again; except in a very few cases, it never gets used again, and only accumulates for nothing. We generally use ours up until there is no virtue left in it, and then throw it away, either into the fire or into the waste box.

Now, we know there are some bosses, who never seem satisfied unless they see a box or refuse paper around, and insist that we must use it, because it is to them like getting double service out of it. So they do, but at what a cost? Sandpaper, as bought by them, stands in the neighborhood of about one-half cent per sheet. Divide that into, say eight parts, which makes the cost about one-sixteenth of a cent per part. It is used until the cutting edge is off, and then thrown to one side. It has done all that can be expected from one-sixteenth of a cent. Now, to use it again will require at least two-thirds more time than at first. Say a man is getting 20 cents an hour; he can use the eighth part of a sheet up in about from 5 to 10 minutes, according to the condition of the job he is doing. Give him 10 minutes, and he has done, say one-half of a large panel. Now make him do the other half with the same piece of paper, and I think I would not be far wrong when I place the time at half an hour, even if he could do it at all, which I doubt. The question is, which is the more valuable—the paper or the man's time? In the first instance, the man occupies one-third of the half hour at a cost of 3½ cents in time, and one-sixteenth cent in paper. To cover the same amount of surface with the same piece of paper again would bring the cost of the time occupied on the second half to 10 cents, from which might be deducted one thirty-second of a cent for the use of the old paper. In other words, trying to save one-sixteenth of a cent, we have actually lost 20 minutes in time, and 6½ cents in money—enough to buy over 13 sheets of new paper. As I said before, we use our paper as long as there is any virtue in it, and no longer. We turn and cut it up so as to get all there is of service in it, and then cast it away.—*Carriage Monthly.*

WHAT CAN BE DONE ON A BICYCLE.—A Hartford (Conn.) paper gives the following report of the performances of an expert on the bicycle: He showed some wonderful things that may be done with a bicycle. Before he got through with his exhibition no one would have been surprised if he had thrown aside the wheel and ridden around on the air where it had been. His best feats were: Riding with small wheel off the ground; hacking with small wheel off ground; swinging in small circle on the big wheel only; facing backward and riding forward; standing up on saddle; sitting on saddle, the machine being still and balanced; machine upside down, mount the big wheel, turn the small one over into place, and start off; removing the small wheel, ride the large one backward or forward; lay handle bars on the ground, mount big wheel, reach over and get the handle, and start off. He succeeded on the third trial and was cheered. Then he removed the handle bar, leaving only the big wheel, which he rode. Next he removed the treadle from the big wheel, and, mounting, propelled it with his hands. Next he stood upright, hands in air, and rode the wheel. Then he brought out a common wagon wheel, placed his feet on the hub on either side and propelled it with his hands. He closed by laying the wheel flat on the ground, suddenly pulling it upright, springing on and riding away. This was loudly applauded.

A PRAIRIE FIRE EXTINGUISHER, which might also be advantageously used in cases of fires in California wheat fields, has recently been patented by A. W. Ramsey, of New Kiowa, Kansas. It has a water tank and heaters, so arranged that when propelled over the lines of a fire it will heat out and extinguish the flames at each side, and ram a swath or belt around haystacks, buildings or fields for protection against approaching fires.

ZINC PAINT.—In the preparation of paint with oxide of zinc instead of white lead, the practice in Germany is to replace the ordinary boiled linseed oil in the mixing operation with one made by gently boiling 200 pounds of raw oil for five or six hours, then adding about 24 pounds of coarsely broken lumps of binoxide of manganese, and continuing the boiling operation for about 10 hours longer. In this manner a very quickly drying linseed oil is obtained,

which is specially adapted for this purpose of being used with zinc white and other zinc colors. Much depends upon the use of old linseed oil, and also upon the pains taken with the boiled oil, which, unless carefully kept from contact with the air, becomes thick in a very short time. The boiled oil so prepared is not to be used in painting with zinc white, but is mixed with from three to five of raw linseed oil of the best quality, while the paint is being mixed together or compounded.

In December last the *Atlas* mentioned a proposition of redwood manufacturers to make extensive shipments of lumber to Eastern cities, if suitable rates could be obtained from the railroads. The parties interested presented the matter to the Transcontinental Association at their meeting in this city, but no conclusion was reached during the session. The disruption of the association and the subsequent war which has sent rates rattling down grades presented excellent opportunities for the large manufacturers to introduce redwood into Chicago and other Eastern markets. They were not slow in taking advantage of low freight, and an immediate movement of considerable lumber has taken place. Messrs. Moore and Smith shipped forty carloads from Stockton to Eastern cities at one time. Mr. Smith has gone East to make arrangements for further consignments, and the indications for a heavy movement are exceedingly favorable, providing reasonably low rates continue. An association of heavy manufacturers has been formed here for the purpose of making large exports of this valuable class of lumber.

WELDING WITH BAD COAL.—The best welding when bad coal must be used, says the *Scientific American*, may be made by pulverizing 10 parts horax and 1 part sal-ammoniac together; then heat the mixture until the water boils off and the mass is dry, and pulverize and use for welding in the same way as with horax powder. A better way (if you cannot get coke) is to make your own coke, for welding use only, by taking from the forge fire, a little at a time, the coked or half burnt coal and quenching it by sprinkling with a little water; lay this aside for special use.

A PLASTIC COMPOUND to be used in the manufacture of burial caskets, furniture, etc., has been patented by Mr. Thomas Law, of Moulton, Iowa. It consists of resin, black lead, sulphur, and rubber, melted and mixed together in stated proportions, that will readily mold and harden to make a waterproof and imperishable compound, and will also form an excellent cement.

GOOD HEALTH.

Killed by Swallowing Silk.

Mrs. John T. Green, residing at No. 479 Ninth street, died Friday of last week, and it was thought her death was caused by a tumor in the stomach. She had complained of excruciating pain in the side and there was considerable swelling. A post-mortem examination conducted by several physicians revealed one of the most singular cases known to medical science. What was thought to be a tumor proved to be a large roll of silk and mohair fibers which had gathered in the stomach in such a way that the passage to the intestines was obstructed. Several years ago Mrs. Green—then Miss Mary Kinney—was employed in a silk factory in New Jersey. It is said that she had a habit of biting off the ends of silk thread and chewing them. In this way it is thought she swallowed small pieces of the thread, which gradually settled at the outlet of the stomach and with mohair which she swallowed—Mrs. Green being apparently a monomaniac on the subject of eating threads, etc.—formed the ball found by the physicians. "It is a most wonderful case," said a physician this morning. "I never heard of anything like it before."—*Troy, N. Y., Times.*

[Balls of hair are frequently found in the stomach of cattle, formed there by the collecting together into a mass of the hair derived from the animal licking itself. Hair will not digest in either the human stomach or in that of dumb animals, and it would appear from the above that silk is also indigestible.]—*EDS. PRESS.*

EXTRACTING TEETH WITH THE PISTOL.—Old Dr. Monsey extracted teeth by fastening a strong piece of catgut securely to the tooth, to the opposite end of which he affixed a bullet. With this bullet and a full measure of powder, a pistol was charged, and when the trigger was pulled, the operation was performed effectually and speedily. Once a gentleman who had agreed to try the novelty, and had even allowed the apparatus to be adjusted, at the last moment exclaimed, "Stop, stop, I've changed my mind!" "But I haven't, and you're a fool and a coward for your pains," answered the doctor, pulling the trigger. In another instant the tooth was extracted, much to the timid patient's delight and astonishment.

OYSTER POISONING.—Complaints in regard to poisoning from eating oysters are not of infrequent occurrence. Quite a little sensation has recently been created in Bombay from this cause. There have recently occurred in that city several cases of death from oyster poison-

ing, death in some instances occurring on the morning following the fatal repast. Until the last few years, it is stated, the Bombay oyster was as harmless as the oyster of Kurrachee is now, and it certainly ought to be possible to explain the reason for the extraordinary change.

Influence of Hot Drinks on Digestion.

Various opinions are held by the public, and we believe by medical men also, on the effect of hot drinks on the digestion of food. This matter has lately been investigated by Dr. V. E. Nyesel, of St. Petersburg. The plan he adopted was to make use of 20 patients in the surgical wards of the Ohukhoff hospital, suffering from fracture of the fibula, contusion of the foot, and such like affections, and dividing them into two sets of ten each, to find out first, by a three days' experiment, the length of time an ordinary meal of soup, meat, potatoes and black bread required for digestion. For this purpose the stomach tube was employed at periods varying from five to seven hours and a half after the meal, and the condition of the contents of the stomach examined. In all the cases complete breaking down appeared to have taken place in about six hours and a half. The exact time required by each individual for the digestion of the specified meal being noted, further observations were made on a subsequent day, the patients in the first group being given after the meal hot tea, at a temperature of from 40 to 60 degs. C., the quantity taken varying from two to eight tumblerfuls. The contents of the stomach were drawn off at the time when, as former experiments had shown, digestion would, under ordinary conditions, have been complete. The result was that, when not more than three tumblerfuls of hot tea had been swallowed, it was found that digestion had progressed just as well as without it, but a larger quantity of hot tea appeared distinctly to retard the digestive process. The second group of patients were given a meal similar to what they had had before, but hot. On examining the contents of their stomachs, no difference could be detected between the rate of digestion of hot and cold food. The author found that by painting the pharynx with a five-per-cent solution of hydrochlorate of cocaine the tube passed easily and quickly.—*Lancet.*

DAMP BEDS.—The *Lancet*, referring to the death of Mr. Maas, the well-known tenor, calls attention to the peril of sleeping in a damp bed. As a matter of fact, this peril is of the greatest, and it is almost ever-present. The experienced traveler rarely hazards the risk of sleeping between sheets, which are nearly sure to be damp, until they have been aired under his personal supervision at a fire in his bed-room. If this be impracticable he wraps his rug around him, or pulls out the sheets and sleeps between the blankets—a disagreeable but often prudent expedient. The direct mischief may result from the contact of an imperfectly heated body with sheets which retain moisture. The body heat is not sufficient to raise the temperatures of the sheets to a safe point, and the result must be disastrous in the extreme if, as is sure to happen, the skin be cooled by contact with a surface colder than itself and steadily abstracting heat all this night through.

There is no excuse for this neglect of proper precaution to insure dry beds. Servants are never to be trusted in this matter, and the managers of hotels, even of the best description, are singularly careless in respect to it.

CATS AS BEDFELLOWS.—Cats are never good bedfellows for children, and especially not for infants. It is a common belief that they will suck the breath of a sleeping infant. Dr. Tomlinson disposes of this question as follows: "What good do you suppose it would do to a cat to draw into its lungs breath which a human being has just exhaled?" Nevertheless, it may be said, with all respect for Dr. Tomlinson and no respect at all for superstition, that the warmth-loving cat has a way of preferring baby's crib as a sleeping place to any other bed or corner. If driven away she will return stealthily again and again to the snug covert. She loves, furthermore, to nestle close to baby's body, as often as not thrusting her whiskered nose against the velvet cheek, pink and warm with sleep. Thus far, she may do no harm, but when she occasionally curls her bulk of five, six or eight pounds' weight upon the sleeper's heaving chest mischief may come of it. To escape the risk of this mischance, if for no other reason, keep pussy away from your snoring baby. Indeed, he is best off without any bedfellow.

POISONED BY COCAINE.—A case of poisoning from the application of cocaine was recently reported to a medical society in New York. The question was fully discussed, Dr. Holcomb saying he had heard that a fatal case of cocaine poisoning had occurred in one of the city hospitals within two or three days. It would be of value to hear from Dr. Douglas the result of his experience in applying, nearly every day for several months a spray of cocaine to General Grant's throat. He was convinced that this drug was one that required great care in handling, and that druggists should label it "poison." Other physicians corroborated these views.

IRON IN MEDICINE.—Tinctures of iron so largely used in medicine, consists of a solution of chloride of iron 35 parts, with 65 parts of alcohol.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

PROSPECTING.—Never before has there been so much activity in the mining industry in this valley, as at present. One company is boring for oil, another is reopening our coal mines, a solid firm is stimulating our new chrome mines, and private capitalists have purchased a manganese deposit. Best of all, each of these operations is backed by capital, and is being pushed ahead without delay. Our mountains are being prospected, too, as they never were before, and we are confident that other valuable mines will be discovered during the coming summer. Gold has been found from time to time in various localities, in small quantities for twenty years, and specimens of both gold and silver ore have been brought in during the past week. What would be of most value now, would be a rich chrome or manganese mine convenient to our town.

HAVE STRUCK OIL.—The workmen of the Livermore oil company struck the first oil rock several weeks ago, and have since been boring through the several strata, with the view of tapping the main stream, or deposit, from which the oil which oozes to the surface is supposed to come. There was first some gas, and then a little oil, and this week quite a stream of oil was encountered. It does not flow but is pumped to the surface. The company will keep on drilling, and Mr. Gutman states that the oil already struck will be used to run the engine instead of wood. It is expected that in or below the lower layers of this oil rock a large stream will be found, with a pressure sufficient to give a flowing well.

Amador.

MISCELLANEOUS.—The big tunnel at Middle Bar has reached underneath the Mammoth works with no developments of importance. A few small stringers of quartz have been met with, and it is probable that by following these rich deposits, gold-bearing metal will be met with as in the upper works. The cannon ball quartz mill at Murphy's Ridge has been moved to the Wetzlar mine, a short distance south of the ridge. The Zeile hoisting works are in good working order again and the shaft is being fixed as rapidly as possible. The mill is not running to its full capacity and not likely to until the shaft is repaired. It is reported to-day that a number of men have been laid off at the Zeile. The job of fixing the shaft will take some time to complete—how long it is still impossible to say. W. F. Detert, the superintendent, started for San Francisco this morning.

LAI D OFF.—Amador *Dispatch*, April 3: Quite a number of miners at the Zeile mine have been laid off for a while on account of a bad cave in the mine, which has interfered with the work of getting out rock enough to keep the mill running for a while. It will probably be several weeks before the mine will be in good working shape again.

THE KENNEDY.—Several heavy castings for the new hoisting works at the Kennedy mine, including a new "skip" weighing 1,000 pounds, were brought up last Wednesday.

Calaveras.

CLEANUP.—*Mt. Echo*, March 31: A cleanup was made at the Stickle mine in this place during the week, the result of which was about \$8000. James Tullac & Son are building an arastra on their mine on the grade between Altaville and Murphys. Mr. David Hunt of this town, has taken charge of the Collier mine situated about six miles southeast of Murphys. A small force of men have already been set at work. A big cleanup was made at the Lane mine in this place last Monday. Twenty-one pounds of pure gold being the net yield of a two week's run. Immensely rich rock has just been struck, and an unprecedented yield is looked for at the next cleanup. A cleanup of the arastra at the Maltman mine in this place, yielded between 25 and 30 ounces of amalgam, which, when retorted will amount to about \$7 per ounce. This yield is the result of a 14 days run. We are informed that the celebrated Gold Cliff mine in this place will start up during the coming month. The Gold Cliff is a valuable mining property, and as soon as it starts, it will be the means of giving employment to a large number of men.

WEST POINT.—*Cor. Calaveras Chronicle*, April 3: Mining is being quite extensively prosecuted in this vicinity, and with some very favorable results. The mine owned by Mr. Keltz is paying a good dividend and it is thought it will be a permanent mine. Messrs. Roe & Jenkins have struck a real bonanza. The Water Lily has suspended operations for the present. The Scorpion mine is still being worked under the management of Mr. Quinn.

Fresno.

ACTIVE.—*Fresno Exporter*, March 30: The mines present an active appearance at present. The season has become settled and work has commenced in earnest. From thirty to fifty and sixty men find employment at present. The Quartz Mountain mine started up again Saturday working forty-five men. These mines have had to contend with the scarcity of water heretofore, but they will fear no scarcity this year. The unusually rainy weather has given them a plentiful supply. Their unfinished and costly canal will not be needed. The mill crushing the quartz is in constant operation at present and the noise made by the stamps can be heard rumbling down the mountain sides miles below. The beautiful house built for the president of the company is unoccupied at present, the president being in France. One of the grandest views in the mountains is obtained from this house. This palatial residence, built at the cost of \$40,000, stands on the top of the mountain, and below on all sides is one of the grandest views in these grand mountains. From the back is seen the lively mining camp and beyond the noisy mill, stretching beyond are vast valleys, beautiful with their spring carpet of grass and flowers.

Inyo.

YGNACIO MINE.—*Inyo Independent*, April 3: For months past Mr. George T. Hawley has had, and still has, a force of men at work prospecting the Ygnacio mine, at Cerro Gordo. The mine is now

so far developed as to put beyond question the fact that it is a valuable property. The Ygnacio will soon be making a valuable addition to the bullion output of Inyo county. About fourteen men are now employed at the mine.

FROM LEAD TO GOLD.—For some time past two miners, Reynolds and Treglow, have been working a lead and silver bearing claim just south of the Eclipse. A few days ago the lead vein pinched out, but just under it the men struck a gold vein that is quite rich. An incline has been put down over twenty feet on the new find and it holds of the same character as far as yet seen. Stopping has been begun and a lot of the ore will be taken out for milling.

HOPE MINE.—The Hope might now with safety be called the Certainty. During the past week the mine has shown up a ledge that is a big thing. Mr. Harris was up at the mine last Wednesday; he says there is seventy feet of backs in the finest looking body of ore he has ever seen in the county. The vein is about four feet wide, and from twelve to thirteen inches of this runs away up in gold. The strike is setting others to work at Chrysopolis. It is reported that a branch railroad will be built from Hawthorne to the Lapanta mine. The length of the branch will be about twelve miles. The building of this piece of road would do much to promote the development of the country in the neighborhood of the Lapanta mine; it is already proven that there is a very promising field there for mining.

MINES BONDED.—*Inyo Reporter*, April 3: A Mr. Radovich, of San Francisco, the reputed purchaser of the Silver Peak property, a short time since, has recently bonded a number of mines out at Lida Valley, and the prospects are that a sale will be consummated.

Mariposa.

RED CLOUD MINE.—*Mariposa Gazette*, April 3: The Red Cloud quartz mine and the ten-stamp, steam power quartz crushing mill, belonging to an incorporated company of that name in San Jose, is situated on Beans creek, ten miles north-easterly from Coulterville. The mill for some time past has been running upon good ore averaging \$30 per ton. The lower level, which is 360 feet below the surface, shows two distinct chimneys near 100 feet apart. The last chimney, which was struck a short time back, was exceedingly rich, and if there had ever been any lack of confidence in the mine, or had about petered out, it was then fully restored, and with a four foot vein in the slope of considerable distance, probably to the surface, evidently gave rise to the value of the mine. The management is under Mr. J. S. Carter, the president of the company, who employs 16 men. About ten tons of ore is crushed every twenty-four hours, which, if the rock pays \$30 a ton (\$720 a day), it must be considered a financial success to its owners. Mr. Daniel Knight the mill-wright, has been engaged in building and repairing at the mill for the last two or three months. He speaks very highly of the mine and thinks it one of the best he has ever come in contact with in the county. The prospect of the Red Cloud mine is very flattering at present, and judging from the great body of ore in sight, it will be a source of profit to its stockholders for a long time to come.

Nevada.

THE YUBA MINE.—*Nevada Transcript*, March 30: George E. Webber, principal owner of the Yuba quartz mine of Washington township, was in town last night on his way back to San Francisco. Mr. Webber has discontinued the mine in this State and is re-incorporating in New York State where he recently disposed of a portion of the stock. The New York parties who invested with him express a desire to purchase the balance of the stock held by him, but the bargain has not yet been closed. Mr. Webber owns another valuable quartz property in the same locality, and should he sell out his entire interest in the Yuba he will at once take steps to open the new claim on an extensive scale.

WILL SOON START UP.—*Foothill Tidings*, April 3: The old Kentucky mine will soon begin work. This mine is situated northeast of the Idaho, and joins the Alpha ground. Being in such a good location, it is a wonder that the mine has lain idle so many years. It has been about 12 years since the works closed down, and at that time it cost so much to keep the mine dry, and to hoist the ore, that it would not pay. Now that water power can easily be obtained and the mine worked at a comparatively small expense, the owners have determined to resume operations, feeling confident that they can make a paying mine of the Kentucky.

RICH ORE STRIKE.—Saturday afternoon the Phoenix mine ran into some exceedingly rich ore, in the slope above the bottom level. A blast was put in and the ledge opened up its treasure chamber bright with pure gold. From a very little place about three candle boxes full of specimens were taken, aggregating about \$600 or \$800. The ledge here is from ten inches to one foot in thickness.

QUARTZ.—*North San Juan Times*, Apr. 3: A very rich quartz vein or lode has been struck on Buckeye Hill, below Sweetland. It is over 40 feet in width, and bids fair to become one of the best quartz mines in the State. The vein runs under Mrs. Sneath's vineyard. It is owned by A. N. Crane and others of this place. The walls are slate.

Placer.

POCKET.—*Placer Republican*, March 31: Judson Wheeler came down from Bath yesterday. Mr. Wheeler says that the recent strike in the Breece & Wheeler proved to be only a pocket of pay gravel and did not last long. They are now opening up new ground and are working on what is supposed to be the same channel the Hazard mine is on.

Plumas.

THE VALENTINE.—*Plumas National*, March 29: This mine is situated at Mohawk. The owners have made a short run which paid about \$75 dollars per ton, and a large amount of the same kind of rock in sight. Messrs. Stephan and Sutton, two of the lucky owners, are in San Francisco negotiating a sale of the property. The ledge is about 20 feet wide and prospects regularly from wall to wall.

THE BUCKEYE.—J. G. Berg, of the La Porte stage, informs us that the Buckeye still looks well as ever, and that Sawpit will have a boom this summer equal to the Haley on days of 1863-4. Ed. Clifford says that in the leading mine of Bell district is the biggest ledge of base ore he ever saw.

San Benito.

GOLD.—*Hollister Advance*, Apr. 2: Gold has at

last been discovered in San Benito county. At least so some people say. L. Miller and H. B. Hinshaw have staked out a claim on the ranch of Henderson Brown, at Brown's Valley, and are actively engaged delving for the shining metal. Samples of ore have been shipped to San Francisco for assay.

San Bernardino.

CALICO DISTRICT.—*Calico Print*, April 4: That Calico is one of the best chloriding camps, if not the best, on the Pacific Coast, is an established fact. A large share of the mining done here is of that nature. It has often been styled the "poorman's camp," and the name is appropriate, because scores of men without means have realized handsome stakes from leases on various mines where the ore is easily extracted, and some have made independent fortunes. There are few who undertake chloriding that do not at least pay expenses, and the number who make more than ordinary wages is considerable. This mode of mining is becoming quite popular as it is a more independent way of making a living, while the prospect of striking rich pockets or deposits of ore makes operations exciting and interesting. The character of the rock in this region is such as to render mining comparatively easy, it not being necessary to timber, no water being found to cause trouble. The rates of milling are gradually becoming lower so that ore that had to be left on the dumps because it could not be milled at a profit to the chlorider can now be taken to the mill by him and realize a fair profit. Leaching works have recently been started in the suburbs of Calico and have proved a success on a small scale, the proprietors being able to make a handsome profit out of ore ranging from \$12 to \$20 per ton. There are millions of tons of low grade ore that can be reduced by the leaching process if carried on extensively. Here is a splendid opportunity for the profitable investment of capital. The camp now is on a permanent foundation, and the prospects of mining being successfully carried on for many years are evident on every hand. The mines are self-sustaining, while progress is constant, while business in every department, properly managed, yields profits ranging from good wages to independent fortunes. E. Elliott & Son have a lease on a portion of the Inevincible and are running a cut so as to get at the ore that is in sight easier. Paul Prisk also has a lease on a portion of the Inevincible and is running a cut. He has a little ore in sight. In addition to the above Eckles & Co. are stopping and drifting on the claim, and take out about two tons of rock per day, and ship about 20 tons per month to Barber's mill. The profits probably range from \$18 to \$30 a day. A rich strike was made in the Kearsage the other day at a depth of about 70 feet. An eight-inch vein was uncovered which has widened to 18 inches. The ore taken from this place is very rich. This mine has proved one of profit to the various companies of chloriders and the owners of the property. The Pinto, owned by Myers & Anderson is looking well. A tunnel has been driven in about 200, which will connect with the main tunnel of the Little V, now in progress. The chloriders on the Comet are taking out considerable ore, some of which gives a high per cent of copper. The work of drifting on the ledge is progressing. Two teams are daily employed hauling ore from the Sam Houston No. 3, leased by McBride and Miller, to the Barber mill.

San Diego.

THE PINACATE MINES.—*Los Angeles Express*, Apr. 3: A. A. Saunders is in from the Pinacate mines, and reports times lively in that district. He has been out there for nearly a year, and has a claim which yields rock that goes \$1248 per ton in gold. Other claims in that vicinity show as well. Mr. Saunders will return in a few days to continue the work of taking out ore.

Shasta.

QUARTZ.—*Shasta Democrat*, March 31: Wm. York, of Vallejo, has been up on Flat creek for several days past testing the Red Rock mine with a view of purchasing. Prospectors are finding some good gold and silver ore on the south fork of Dog creek, and several locations have been made during the past ten days. W. P. Miller, M. E., was up on Squaw creek a few days past looking at mining property in the interest of mining capitalists. He has a high opinion of the district. The Mammoth mine in Old Diggings district was sold last week to Messrs. Shattuck & Shearer for \$20,000. Part cash was paid down, the remainder to be paid in six and twelve months. Whit George last week struck a fine prospect on Clear creek adjoining Senator Jones' mine. The vein appears to be about ten feet wide, the surface ore of which prospects big in free gold. Hart & Day, who purchased the Fleming mine in Old Diggings district last fall, have incorporated under the name of the Georgia and Texas Milling Company, with Mr. Hart as superintendent. The company is preparing to add five more stamps to its mill. Last Monday our old friend and prospector, John Finley, showed us several fine specimens of free gold ore from a ledge he and Peter Cowan located a few days ago. The "find" is situated about a mile southwest of the Buckeye Ranch, Lower Springs district. They have sunk ten feet on the vein and already have taken out several tons of very rich rock. Our reporter visited Squaw creek last Saturday and Sunday and found the camp livelier than ever. The Croesus company is rushing its mill to completion with all possible haste, and expects to have it running inside of twenty days. Carson & Snyder have their tunnel completed a distance of 120 feet, which gives them over 100 feet of stopping. Their mine shows up well and is attracting much attention. Frank Davis, of the Clipper mine, is driving his tunnel ahead rapidly, which is now in a very rich body of ore. The boys are now figuring on putting up a mill, as they have sufficient high-grade ore in sight to warrant the investment. Fred Meyers last Monday delivered the last load of machinery for Reilly & Mathews. This company expects to have its mill running in 30 days.

Sierra.

ALASKA SHUT DOWN.—*North San Juan Times*, Apr. 3: The Alaska is again shut down and is rapidly filling with water. The large pump used in freeing the mine from water became disabled several days ago, and while working upon the pump the water was kept at a standstill by drawing it off in tanks. After some time the cable, to which the tanks were attached, broke, letting one of them into the sink. This put a stop to everything until a new pump can be put in. When it is remembered that this mine runs a stream of 90 inches of water con-

tinually, it will be seen what an immense amount of damage an accident like this implies.

GOOD HOPE.—*Mt. Messenger*, April 3: H. H. Purdy, manager of the Good Hope mine, has put in a water-blast to furnish the men in the tunnel with air. The rock is of such a character as to require blasting.

Trinity.

PLACERS.—*Shasta Co. Democrat*, March 31: The Trinity county placer miners are clearing up after having a good season's run, and Weaverville is lively in consequence.

WILL GO TO NEW RIVER.—*Humboldt Standard*, March 30: We find many citizens of Eureka who are still enthusiastic in the belief that fortunes await them as the result of well-applied and untiring labor in the New River section. There are a good many people in Eureka who will go there before the close of spring. Those here who have interests in New River are equally sanguine, and will commence work with renewed ardor this year. The cost of prospecting and opening of mines cannot be so great as they were when the first discoveries were made in Nevada, Bodie, or many other sections which could be instanced. There is no telling what this year's developments at New River will result in.

MORE STAMPS.—Mr. Henry Martin, Superintendent of the Brown Bear Mining Company's works at Deadwood in this county, was in town this week. He has just returned from a business trip to Marysville, where he went to order five additional stamps for the Brown Bear Mill. The new battery will arrive and be set to work as speedily as possible, making fifteen stamps in all at work on the rock from that mine and leased ground. The Brown Bear is proving a bonanza and no mistake.

RICH ROCK.—We learn that Van Matre & Ramm who have a portion of the Monte Cristo mine at Deadwood leased, have struck another bunch of very rich ore. A sample of two ounces was tried the other day and yielded \$1.37. Good enough.

WEAVERVILLE never was much duller than it is at present. Miners at work and all hands hoping for more lively times in the sweet bye-and-bye.

Tuolumne.

RICH ROCK.—*Tuolumne Independent*, April 3: A strike was made last week in the Simonich claim, at Brown's Flat. Some very rich rock was found, but how extensive the chute may be has not yet been determined.

NEVADA.

Washoe District.

HALE AND NONGROSS.—*Enterprise*, April 3: Since the connection has been completed with the 2900 level by the winze or upraise from the 3000 the air circulation thus established has been just what was desired, and as soon as the upraise can be properly finished up it is proposed to stoop from it into the merits of the good ore vein it has been passing through. Drifting north is resumed in the face of the main north lateral drift on the 2900 level toward the Savage line in low grade ore, to show up what exists in that direction in the shape of richer and better ore. The ore body being developed in the upraising above the 3100 level is showing up finely and improving. This ore runs high in gold as well as being heavily charged with black sulphates of silver. There is plenty of the ore, but the richest it lies in bunches and streaks amid quantities of low grade ore. It is, however, fully demonstrated that good-paying ore can and does exist at these great depths. And the richest ore being found in bunches is a very favorable indication of the possibility that a large bunch or concentration may be encountered at almost any time. The quality, also, of the ore at this lowest point—between the 3100 and 3000 levels—is better than found above, being of a purer, more kindly and fertile character.

CON. CALIFORNIA AND VIRGINIA.—The regular daily yield continues to be a little over 400 tons per day, two-thirds of which comes from the lower levels and the rest from the old upper workings, the general average of all the ore worked at the Morgan and Eureka mills being about \$17 per ton. On the 1650 level the new crosscut west, No. 1, is making good progress toward the old ore stoops.

GOULD AND CURRY.—The main southwest drift on the 600 level has been cleared out, retimbered and put in complete order throughout, and is now being advanced in new ground, the direction being turned to the east of south. The face is now about 160 feet from the Savage north line and in quartz and vein porphyry. The crosscut west recently started from the main southwest lateral drift about 220 feet north of the Savage line is in 52 feet, all the way in strongly mineralized quartz.

OPHIR.—The south lateral drift from the main west drift, from the old Mexican shaft, on the 300 level, is in 76 feet. Material in face, vein porphyry and low grade ore. On the 400 level the north lateral drift on the 360 feet. Material, same as above. The rock chute leading down to the 500 level has been repaired and put in complete order.

CHOLLAR.—Supt. Hamilton has returned from San Francisco, but it was deemed advisable by the directors of the company, as well as the superintendent, not to resume sinking the Combination shaft just yet, or until the south lateral drift, in Potosi ground on the 3100 level, has been run through to the Bullion mine. Crosscutting in Chollar is talked of, but will not be indulged in at present.

ALTA.—The main north lateral drift on the 700 level has about reached the Benton south line. The material encountered has been principally dry vein porphyry, with occasional bunches and streaks of low-grade ore. The main ore vein lies to the westward and will be made the subject of crosscutting explorations hereafter.

MEXICAN.—On the 500 level west crosscut No. 2, from the main north lateral drift, is in 125 feet. Face in vein porphyry. On the 700 level the Joint Union and Mexican drift, running northwest from the Ophir shaft, is in 583 feet; material, vein porphyry, with occasional streaks and bunches of quartz.

POTOSI.—Excellent progress continues to be made in advancing the main south lateral drift on the 3100 level, it being now 225 feet from the Chollar north line. The ground is dry and favorable, the drift following rather to the southeast along the west side or footwall of the ore vein.

BEST AND BELCHER.—Since the donkey pumps started up last Tuesday the water in the Osbliston

shaft has been lowered 24 feet, and it still continues to recede in a satisfactory manner, draining the ground as it goes.

CROWN POINT AND BELCHER.—The daily yield is increased to 400 tons, the Vivian mill now also running on ore from these mines. The lower levels, as well as the old slopes of the upper workings, are turning out finely.

SIERRA NEVADA.—The crosscut west on the 520 level is in 297 feet, 29 feet having been added during the week. The material is very hard, dry porphyry and quartzite, allowing of no rapid advancement.

YELLOW JACKET.—Daily yield 130 tons from the old workings above the 1300 level. A good force of men are kept at work exploring and opening up new ore resources on the various levels.

MONTE CRISTO.—Running the drifts west from the new shaft on the 50 and 150 levels in hard rock. No ore being extracted from the mine at present.

KENTUCKY.—About 45 tons per day continue to be the daily output of ore from the mine, which is reduced at the Rock Point mill.

UNION CONSOLIDATED.—North lateral drift No. 2 on the 500 level is in 336 feet. Advancing in vein porphyry.

Bradshaw District.

THE OUTLOOK PROMISING.—*Silver State*, Mar. 29: Charles Day and Robert Fugit, two experienced and enterprising miners, are quietly developing mining claims in Bradshaw district, which give promise of being valuable mines. The district is situated in the range west of Winnemucca mountain, about 22 miles north of west from Winnemucca, and embraces a part of what was formerly known as Silver State district. The formation is a soft variety of granite, capped with slate, though some of the principal veins have granite hanging and foot-walls. Two of the leads, owned by Messrs. Day & Fugit, are prospected to some extent. One, the Silver State, has an incline 135 feet deep on the lead. In seeking this incline, several hundred tons of ore, which is estimated to contain \$50 per ton besides a smaller quantity of richer ore, was extracted. Of the latter quality, 9000 pounds was brought here yesterday by Elias Jones' team, for shipment to Salt Lake. This ore averages about \$300 per ton, and resembles that produced by the Ohio company's mine at Rebel creek. The other lead, which is named Beck, in honor of the Kentucky senator who so ably advocated the cause of silver, is prospected by a shaft to a depth of 65 feet. The ledge is from five to six feet wide, and will average about \$40 per ton. The ore is of the sulphuret variety, and by the concentration process of reduction ten or twelve tons can be reduced to one worth from \$400 to \$500. There is an excellent opportunity for some person to build concentrating works in the district, with the assurance of having plenty of ore to keep them running steadily.

Bristol District.

DOING WELL.—*Pioche Record*, March 29: Chas. Roe writes in from Bristol that since the completion of the roaster at the mill he is doing well, having taken out sulphides worth \$10 a pound. Would it not be policy for the Bullionvillians to take a trip out to Bristol and try to pick up a point or two that might aid them.

Columbus District.

THE MILL.—*Cor. Inyo Register*, Apr. 1: Finishing touches at the mill comprise a retort house and assay office. A platform has been built from the ore receiving room to the bank in the rear of the mill. They are also building an ore chute 100 feet long, and are completing a water-tank with a capacity of 20,000 gallons. Col. Sunderland is now en route to London with the view of getting the English company to purchase some of our mines. It is the only way to utilize the mill; otherwise it is a dead letter.

Eureka District.

ORE.—The Dunderberg mine on Prospect mountain continues its shipments of ore in good shape. Thirty-four and a half tons were sent down to the Eureka Con. works during the past week. From the Enterprise mine, Prospect mountain, six tons of ore were shipped to the Eureka Con. works day before yesterday. Ten tons of ore were shipped from the Frazier and Molino mine on Adams Hill to the Richmond reduction works on Wednesday last. Some six or eight lots of ore are at the Richmond furnaces awaiting sampling, which work cannot be done for a day or two owing to repairs being made.

Globe District.

GOLD MINE.—*Belmont Courier*, March 29: Work is being pushed in the new gold mine in Globe district. It is confidently expected by those interested that the next mining excitement will be in this district.

Gold Mt. District.

SUSPENDED.—*Belmont Courier*, March 29: Work has been suspended in the mines and mill at Gold Mountain. The cost of working was greater than the value of gold produced—hence the result.

Hawthorn District.

A GOOD CLEANUP.—*Walker Lake Bulletin*, Mar. 31: The Cat creek mill made another cleanup on Saturday from a run on Pamlico ore. This lot of ore averaged \$100 and has put the Pamlico on a solid footing among the paying mines. It has now within six months of the date of location been put into working shape, and enough money has been taken out while developing was progressing to pay all expenses and leave a margin for dividend.

Jefferson District.

MILL.—*Belmont Courier*, March 29: The Harrison Brothers will soon start up their little mill at Jefferson.

Mineral Hill District.

QUIET.—*Cor. Eureka Sentinel*, Mar. 29: Mining matters with us may be said to be quiet. Just at present but little is being done in the way of prospecting. In fact, there is too much snow to admit of much surface work. A few men have been kept in the company's mines all winter, and are breaking some very good ore. The pans are running at the mill on slickens, but the battery may not be put to crushing for a month or more yet. The Lost mine, south of town, has been worked most of the winter, but just at present is lying idle for some unexplained reason. This property is owned principally in Eureka, and has produced considerable good ore. The Hecla mine, also the

Lucky have yielded some very rich rock this winter, although not in large quantities.

Park Canyon District.

TO BE RESUMED.—*Belmont Courier*, March 29: Operations will be resumed in the Giant mill, Park canyon, about the first of April. Everything being in tip-top running order, big shipments of sulphides to Salt Lake will be in order.

Pennsylvania District.

MILL RUNNING.—*Pioche Record*, March 29: The mill at Pennsylvania district is running first class. The retort is about completed. The men have been put to work extracting ore.

Pioche District.

CHLORIDERS.—*Pioche Record*, March 29: On Monday the chloriders at the Bullionville mine, to satisfy themselves as to the grade of ore they were extracting, shipped a small batch of ore into town, and it sampled 243 ounces silver per ton. This result satisfied the boys that they were extracting pay "filth."

Spanish Belt District.

ORE.—*Belmont Courier*, March 29: Some very fine ore is being extracted from the Barcelona mine at Spanish Belt. It will be shipped to Eureka for reduction.

Tuscarora District.

GRAND PRIZE.—*Times-Review*, April 3: North drift on the 200 extended 28 feet. The slopes above the 200 are producing some very good ore at present. Everything of value is being removed from the 400 level, as the water is now in the level.

Union District.

CHLORIDERS.—*Belmont Courier*, March 29: Some few chloriders are at work in Union mining district.

Washington District.

BASE ORE.—*Belmont Courier*, March 29: Capitalists will some day take hold of the mines of Washington district, which have lain idle so long. As soon as silver reaches anywhere near par these locations will be profitably worked. The deposits of base ore there are said to be immense.

ARIZONA.

ORE.—*Mohave Miner*, March 29: A carload of ore from the Golden Queen mine, Arrowhead district, San Bernardino county, was recently worked at the Kingman Sampling Works, which returned \$91 per ton in gold. It is currently reported that the Providence Mining Company and other mining capitalists will erect immense smelting works at the Needles in the near future. If this be so Mohave county will become the banner mining county of the west. The Kingman Sampling Works recently worked 10 tons of silver ore from the Jim Blaine mine in Five Points district, San Bernardino county, which realized \$240 in silver, \$18 in gold and 41 per cent lead. The net amount obtained from this shipment above all expenses was a little over \$2,500. Messrs. Wright and Layne made a shipment yesterday from the Prosperity mine, Todd Basin. Mr. Dana has five men at work on the Franklin mine at Stockton Hill, and has struck a fine body of very high-grade galena ore. Tom Burke made a shipment of five tons of rich ore from the I. X. L. mine last week. J. H. Johnson is making a good thing out of the C. O. D. mine. He sent another carload to Kingman last week. Two Duncan concentrators have been received at the Cerbat mill, and as soon as they can be placed in position the mill will start up, so Supt. Barry informs us. W. H. Sherman has just shipped a carload of lead ore from the Champion mine.

TOMBSTONE.—*Democrat*, March 30: Since our last report the work of the camp has been steadily but surely progressing. The number of chloriders at work at present has greatly increased, and the result of this labor is generally remunerative. Were charges lower a greater number of claims could be worked, but time will, no doubt, bring this about. The pumps on the hill are still quiescent, but, with the recommencement of raising the water, the spirits of all in camp and its returning prosperity are assured facts. No better proof than those best posted have faith in the permanence and durability of the camp can be found than the fact that the Randolph and Junetta mines have lately passed into the hands of one of the most largely interested mining men here. This points to their steady development and the consequence of more men.

BISBEE.—*Tombstone Democrat*, March 31: Any person visiting this camp to-day who has not been there the last four years would certainly be struck with the many changes that have taken place. The well-known quarry where ore was first struck has yielded over 60,000 tons, and since the consolidation of the Queen and Atlanta Companies the developments under ground have been carried on with great perseverance and success, many different ore bodies having been discovered, most of which are reserved for future use. At present about 100 tons of ore daily are run through the two smelters, the average grade of which is about 8 per cent copper. In places the copper is found with manganese; this smelts better than when the iron oxide predominates and produces a higher grade of copper bullion. Thirty-five men are daily employed breaking ore whilst around the smelter, and in other parts of the mine the total of men on the pay roll is about 80.

THE LOOKOUT.—This is one of the Neptune Company's properties leased to Mr. Cloud. The success he has met with has induced him to remove the smelter formerly at Hereford to this place and it is now being erected. It is calculated that there is enough ore in sight here to run this smelter for at least six months whilst the work of development is being daily carried forward. The abnormally low price of copper has induced economy in every branch. Miners' wages now stand at \$3 per day. Copper bullion is about 5 to 5½ cents per pound as near as can be ascertained.

LEASED.—*Prescott Courier*, April 2: The Parker mine, on Groom creek, which adjoins the King Kelly on the south, was on Saturday last leased to Mr. Fink. The drift in the Kelly mine after running its full length, 125 feet, on an unbroken body of high-grade ore, entered the Parker ground last week. It will be continued into the Parker and a shaft of 100 feet will be sunk to explore the ground in both Kelly and Parker mines below the level of the drift referred to. The ore is a gold bearing sulphuret easy of concentration and will be worked in a mill which it is intended to erect on the creek in the neighborhood of the mines, Wells H. Bates,

formerly connected with the Marcus mine, has organized a New York company to work 10,000 acres of placer ground below Walnut Grove. The work contemplates an immense reservoir for the storage of water, a pipe line of 14 miles in length and an expenditure of \$250,000 to put the enterprise in working order. Prof. Blake, the well-known mining engineer, has recently been over the ground in the interests of the company and it is confidently predicted that the work will be completed by next fall. Good news keeps coming from Mr. Gray's mill and the Compton mine, Turkey creek district. Capitalists want the Gray Eagle mine, Bradshaw district, which is one of the largest and richest gold properties in this or any other Territory. Mr. Flint is in town from the headwaters of Hassayampa creek. He says but little about mines of his district, but it is a well-known fact that many of them are pretty well developed and will bear inspection. Those who ought to know tell us that Humburg district, which lies on the southern slope of the Bradshaw mountains, will, ere long, have 600 or 700 miners. The St. Louis Yavapai Co., is doing a great deal for development of the district, which has no equal in Arizona as a producer of high grade gold and silver ores. A partial clean up at the Lynx creek hydraulic diggings was made last week, when gold to the value of \$1,200 was taken from the boxes. A pan of stuff from another set of boxes, yielded \$4, and it is thought that the heavy stuff in them would run up into the thousands.

COLORADO.

NEW DISCOVERIES IN LAKE.—*Tribune-Republican*, April 3: Prospecting is being carried on at Leadville, more vigorously and extensively than in any other mining section of the State. There are many illustrations of the activity now shown in searching for new mineral bodies in old properties and in virgin territory. Cecil C. Morgan is reported to be doing well with the Agassiz, and Billy Christian has opened a bonanza in the Cleveland, where he has persistently delved for several years. Bill Loveland has either struck or salted rich ore on the north side of Big Evans gulch, while the deep, wet shafts on East Fryer and Yankee Hills are gradually proving the presence of valuable mineral chutes over a very extensive area. Nowhere in the State is prospect work being done in so intelligent and thorough a manner as at Leadville, and the result will undoubtedly be to make the Carbonate camp more famous as a producer in future years than in the past.

AS USUAL.—*Idaho Springs Gazette*, March 30: A large strike of rich ore has been made in the Argo mine, Ute creek, by the lessee. This property has remained idle a long, long time, after being purchased by a company, who elected a whim, shaft nouse and a boarding house, and then agreed to disagree. After a few years of idleness, along comes a tenderfoot from Denver who takes a lease and bond on the property, and if he don't take the purchase money out of the mine he will come very near it. Then a dozen old-time miners, who always know it all, will stop cutting the grocery counter and in one breath say they knew it was that.

IDAHO.

NOTES.—*Ketchum Keystone*, March 29: The Minnie Moore, Idahoan and North Star will be the heaviest producers in the county this year. Since January first, 1886, the Idahoan mine has yielded 26 car-loads of first-class ore, averaging 13 tons per car, and paid out about \$7,000 for machinery, besides 30,000 in dividends. A new mining district, to be known as Arco Mining district, has just been organized, with Arthur Judges Recorder. This new district is bounded on the north by a line dividing Custer and Alturas counties, on the east by Houston mining district, on the south by Snake River lava beds, and on the west by the Lava Creek and Antelope mining districts. The Florence claim, located just below the Baltimore mine in 1883 by S. R. Millon and Joe Nibbler, is just coming to the front and promises to be an ore producing property. Mr. Millon and his partner took in a third party, Dr. A. C. Lewis, and commenced work on the claim in February, running a short cross-cut and then sinking, and have gone down thirty feet on the ledge and found eighteen inches of quartz, carrying iron pyrites and black sulphurets. The vein is uniform and will probably assay over 100 ounces per ton. The surface rock was honey-comb iron oxide.

STRIKE IN THE QUAKER CITY.—Just as we go to press news comes to town that six inches of that rich ore peculiar to the Quaker city has been struck in that mine. Prof. Jenney is quite jubilant over the strike.

MONTANA.

LA PLATA.—*Miner*, Mar. 27: The Silver Bell shipped twenty-nine tons of ore yesterday. About 400 tons of ore is piled up at Sheridan Junction awaiting transportation. Eight thousand dollars' worth of ore is piled up on the dump of the Gray Eagle. The Genesee ships 125 tons per month, but has temporarily suspended shipments for repairs on the mine. Duggan & Co., who have the lease on the old workings of the National Belle, have struck a good sized pocket of \$60 ore. Manager Harvey of the Silver Bell has contracted with Fraser & Chalmers of Chicago, for a \$12,000 Cornish pump. It will be a daisy. Two shifts are working on the tunnel to cut the Treasure Trove. Two hundred feet remain to be run, and on its completion will prove up one of the biggest ore bodies in that section. The tunnel now being run to cut the Lone Star is in 160 feet with fifteen feet to go. As the rock is very hard it will take about two weeks to reach the ore body. The Copper King is outputting four tons per day. The mine is in excellent condition. Twelve men are working the Black Lightning, one of the best properties in Pongheepsie gulch. The crosscut has reached the vein, and a large body of high grade ore was cut. There are about fifty tons of ore on the dump. Messrs. Woods, Hovey & Robbins will begin work on the Last Chance, a newly located Red Mountain property in the vicinity of the Charter Oak. A shaft of twenty feet is on the claim and a four inch streak of iron and galena is showing. The shipments of ore for the past week were forty-four carloads, making 351 cars or about 3,500 tons to date. As the cars in some instances fall short of ten tons

each, it is impossible to give the same statement in tons; and as some cars have a capacity of twenty tons, ten tons per car is not below the average.

THE OLD PENOBSCOT.—*Helena Independent*: The once celebrated Penobscot mine is indissolubly connected with the history of Helena and might be said to be the mine which first drew attention to Montana as a mineral territory of fabulous possibilities. It was located about ten years ago by three miners who sunk two shafts on it, and who sold their prospect to Nate Vestal in '76. After realizing a fortune Vestal sold the mine to Eastern capitalists for \$400,000 cash. After working it profitably for several years the rich ore gave out, and the company slunk down for good. Last summer John Longmaid bought the property for \$4000, and has since been working on Penobscot ore which the former owners considered worthless. Last week Mr. Longmaid made a rich strike by sinking a shaft in a part of the Penobscot that had not been touched before. A depth of twenty feet developed a vein of a foot to two feet wide of free gold quartz of wonderful richness, stated to be exactly similar to the old Penobscot. Specimens brought in will assay way up in the thousands.

NEW MEXICO.

SHIPMENTS.—*Silver City Enterprise*, March 30: Caples and Sweetland, who have a lease on the Willis and Martin mine, in Hanover gulch, are now making regular shipments from their mine to Socorro. Their ore averages from 30 to 40 per cent lead, and from 6 to 10 ounces in silver, and some of their ore has assayed as high as \$1700 in gold. The ore has attracted the attention of the Billing people at Socorro, who sent a man out last week to take a look at the property. More prospecting and developing is now being done at Hanover than for years past. Old-time Pinos Altos is fast forging to the front as a producer.

SILVER.—*Silver City Enterprise*, April 2: The silver bricks were shipped from Georgetown this week. The Mimbre mill at Georgetown is running on regular time. An extension has been given to the bond on the Alaska mine, in Cow Springs district, until the sixth day of this month, at which time parties who were represented by Mr. Degnan will be on with the money to take the property.

OREGON.

PLACER AND QUARTZ.—*Jacksonville Times*, Apr. 2: Quartz is being hauled steadily to the mill here, which is kept busily at work. The showers of the past week have a tendency to keep up the water supply somewhat. Prospecting continues everywhere and excellent prospects are reported in many places. Wm. Wade, who is mining near Grant's Pass, picked up a nugget worth \$50 in his claim not long since. Messrs. Craft and Witt are prospecting some placer mines in the Blackwell district, with excellent results. The placer miners have well nigh given up all hopes of a spring run, and most of them are cleaning up. Prospecting continues unabated in the Blackwell and Gold Hill districts, where some fine quartz ledges exist. A quartz nugget, containing about \$20 in gold, was picked up in Dean & Co.'s diggings in the Willow Springs district recently. R. J. Orme informs us that considerable prospecting is being done in the Foothills Creek district and that some good ore has been struck. B. A. Knott, of Blackwell district, has discovered a promising quartz ledge, and is building an arastra with which to work the ore. A rich strike has been made in Granville, Sears & Co.'s quartz ledge about four miles from Jacksonville, and considerable excitement has been raised in consequence of it. Brown & Co. intend adding more improved machinery to their quartz mill in this place, and a machinist from Portland is here seeing what is wanted. There is no better mill in the State than this one. Placer miners in Josephine county are also complaining that the water supply is getting light, and many of them are preparing to wind up the season's work. A better run than for several years past has been had and good results may be expected. C. H. Burton, of Grave creek, writes us that the miners are busy cleaning up, and that water holds out well. He says there will be more gold taken out there this spring than for four or five years past. They never had a better run of water. A correspondent of the *Times* writes from Evans creek: Boyd & Johnson are again making Woodville headquarters. They are interested in four ledges that run \$10 and over. Some of the best ore runs \$400. Mr. Wilcox has struck an extensive gravel deposit one mile back from Evans creek that prospects well. The Carter Bros. were in on Saturday and disposed of \$125 worth of dust from their claim on Saxe's creek. Hannum & Co. on upper Grave creek are still pipping. There are several other good paying claims in that locality.

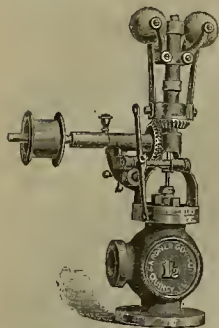
UTAH.

THE CHRISTY CO.—*Southern Utah Times*, March 29: The crosscut, run from the bottom of the winze below the 250-foot level in the Stormy King, tapped the upper vein this week so that stoping can now be operated on both veins.

THE STORMONT CO.—An average of 37 tons of ore was shipped from the mines to the mill last week. The slopes in the Thompson are looking favorable, and at present are furnishing considerable good ore. A crosscut was started this week on the fifth level south in the Buckeye and Savage towards the hanging after reaching which winze No. 30 will be sunk to the 600-foot level. The ledge, at this point, is 30 feet in width, and as the country above it has produced a large quantity of ore, some good stoping ground will probably be opened up.

THAT NEW STRIKE.—The Virgin City strike was a humbug, conceived by an impecunious chlorider who realized a sack of flour and a slab of sowbely out of the excitement. Most of the rock failed to show a trace of silver.

OTHER NOTES.—Indications are that the lessees of the Honest Miner, on the White Reef, will develop a paying mine. The boys are working in five feet of fair grade ore in the incline. Bob Lund returned from El Dorado, with favorable reports of the Canyon mines. The Lucky Jim, owned by Reefers and operated by Jim Cronin, is showing up well. Two shafts 100 feet each, show the ore body from top to bottom. The rock runs from 400 to 700 ounces silver, and \$30 gold.



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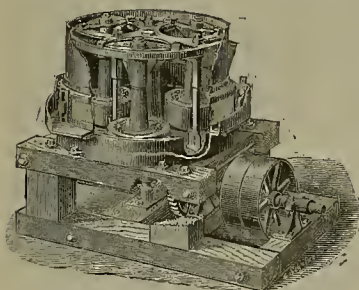
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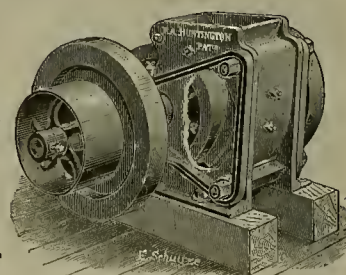
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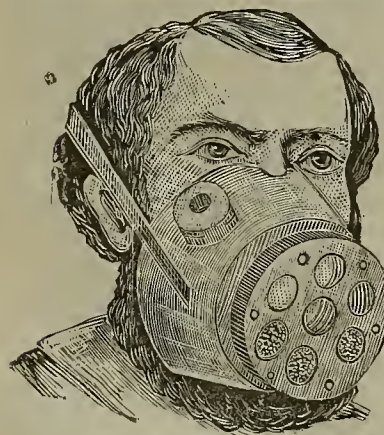
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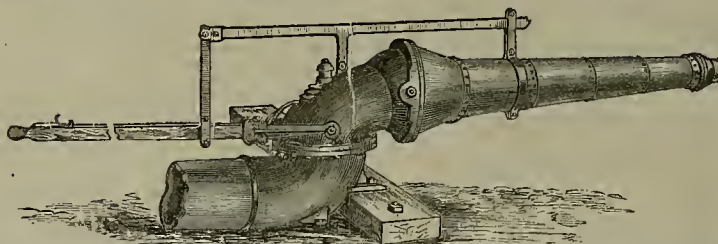
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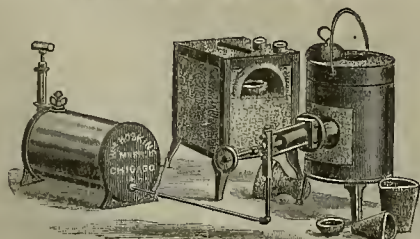
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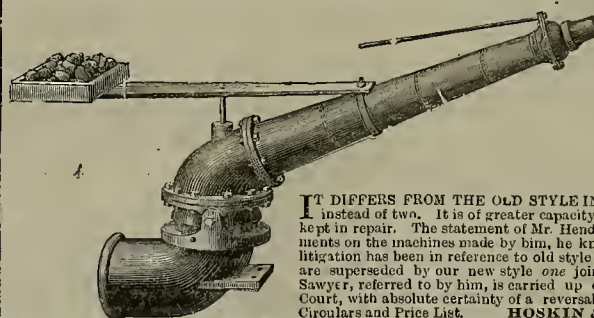
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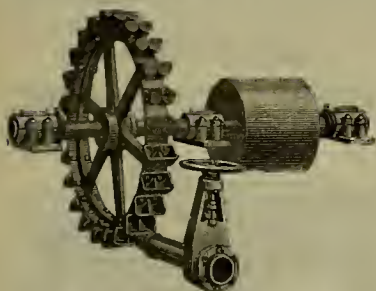
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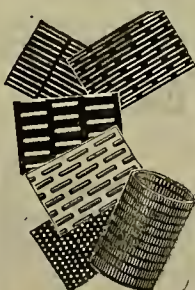
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ASSESSMENTS.										
COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.		
Alpha Con M Co.....	Nevada.....	2.	50.	Mar 4.	Apr 8.	Apr 29.	W. Willis.....	309 Montgomery St.		
Andes S M Co.....	Nevada.....	28.	25.	Feb 16.	Mar 23.	Apr 12.	B. Burris.....	309 Montgomery St.		
Buenavista Petroleum Co.....	California.....	33.	1.60.	Mar 16.	Apr 10.	May 10.	J. Morizio.....	328 Montgomery St.		
Boston M Co.....	California.....	1.	14.	Mar 6.	Apr 10.	Apr 26.	M. McDonough.....	Grass Valley		
Con Anador M Co.....	California.....	11.	1.00.	Apr 7.	May 10.	May 10.	F. B. Latham.....	327 Pine St.		
Con Pacific M Co.....	California.....	8.	15.	Feb 15.	Mar 22.	Apr 15.	F. E. Luty.....	330 Pine St.		
Crocker M Co.....	Arizona.....	2.	20.	Mar 10.	Apr 13.	May 21.	A. Waterman.....	309 Montgomery St.		
Gover Improvement Co.....	California.....	1.	50.	Oct 8.	Mar 25.	Apr 19.	R. N. Van Brunt.....	318 Pine St.		
Gould & Curry M Co.....	Nevada.....	22.	40.	Mar 27.	Apr 30.	May 25.	A. K. Durbow.....	309 Montgomery St.		
Lucky Hill Con M Co.....	Nevada.....	2.	05.	Apr 9.	June 7.	July 2.	F. D. Black.....	27 Eliza St.		
Martin White M Co.....	Nevada.....	21.	25.	Mar 16.	Apr 20.	May 20.	J. J. Scoville.....	309 Montgomery St.		
Manhattan M Co.....	California.....	9.	01.	Mar 20.	Apr 24.	May 15.	A. B. Brady.....	Grass Valley		
North Banner Con M Co.....	California.....	11.	15.	Apr 3.	May 6.	May 24.	J. J. Mitchell.....	Grass Valley		
North Belle Isle M Co.....	Nevada.....	10.	25.	Mar 2.	Apr 6.	Apr 23.	J. W. W.....	310 Pine St.		
Peerless M Co.....	Arizona.....	7.	25.	Mar 3.	Apr 5.	Apr 27.	A. Waterman.....	309 Montgomery St.		
Planet Con M Co.....	California.....	14.	01.	Mar 2.	Apr 3.	Apr 22.	M. Byrne.....	Grass Valley		
Pennsylvania M Co.....	California.....	4.	01.	Mar 22.	Apr 4.	May 18.	M. Byrne.....	Grass Valley		

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Bulwer Con M Co.	California.	G. W. Sessions.	309 Montgomery St.	Annual.	Apr 14
Homeward Bound Pl M Co.	California.	D. A. Smith.	299 Post St.	Annual.	Apr 16
Kentuck M Co.	Nevada.	J. W. Pew.	310 Pine St.	Annual.	Apr 12
Live Oak Drift M Co.	California.	T. Wetzel.	309 Montgomery St.	Annual.	Apr 15
Mocking Bird M & C Co.	California.	L. H. Sharp.	218 Sansome St.	Annual.	Apr 12
Onah M Co.	Nevada.	E. F. Gerald.	4th & Townsend Sts.	Annual.	Apr 12
San Jose De Gracia M Co.	Mexico.	C. A. Morse.	217 Sansome St.	Annual.	May 10
Tioga Con M Co.	California.	G. W. Sessions.	309 Montgomery St.	Annual.	Apr 12

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Caldonia M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Feb 23
Con Virginia & California M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	30.	Feb 12
Derbec Blue Gravel M Co.	California.	T. Wetzel.	309 Montgomery St.	10.	Feb 10
Holmes M Co.	California.	C. E. Ellis.	319 Montgomery St.	25.	Mar 20
Mono M Co.	Nevada.	G. W. Sessions.	359 Montgomery St.	25.	Mar 10
Manhattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Feb 17
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar 15

List of U. S. Patents for Pacific Coast Inventors.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

- FOR WEEK ENDING MARCH 30, 1886.
- 338,699.—HARVESTER—H. A. Benton, Farmington, Cal.
- 338,821.—CAR COUPLING—I. H. Bradshaw, S. F.
- 338,823.—CABLE RAILROAD SWITCH—Brown & Stratton, S. F.
- 339,043.—HORSE UNHITCHER—A. J. Coffee, Portland, Oregon.
- 338,832.—OIL CAN—W. G. Dinsmore, Oakland, Cal.
- 338,833.—DASH-BOARD ATTACHMENT—M. Fahy, Oakland, Cal.
- 339,091.—COTTON GIN—S. D. Freeman, Fort Thomas, A. T.
- 338,842.—OIL STOVE—H. L. Howse, S. F.
- 338,755.—BRIDGE—H. Krusi, S. F.
- 339,005.—WASHING MACHINE—W. V. Lawlor, S. F.
- 338,858.—FLOUR BOLTING REEL—W. C. Meyer, Vallejo, Cal.
- 338,859.—BUOY ATTACHMENT FOR VESSELS—P. Micheletti, S. F.
- 338,868.—MIXED PAINT—Pearce & Beardsley, Oakland, Cal.
- 338,869.—GATE—E. H. Penfield, Santa Barbara, Cal.
- 338,794.—EFFLUVIA EJECTOR FOR WATER CLOSETS—Wm. Smith, S. F.
- 338,799.—WINDMILL—S. Standish, Pacheco, Cal.
- 338,885.—BALE AND BOX HOOK—P. J. Stockinger, San Jose, Cal.
- 338,887.—FIN CAN SEAMER AND JOINTER—C. M. Symonds, S. F.
- 338,905.—VEHICLE SPRING—Jas. R. Wright, Portland, Oregon.
- 16,589.—SCARE PIN DESIGN—J. A. Bidwell, Ivanpah, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Mining Share Market.

The mining share market is pretty well demoralized, sales being few and prices low. In their sworn financial statements the following mining companies report a balance on hand, April 1, 1886: Consolidated California & Virginia, \$33,814.60 in cash and \$77,312.86 the face value of market bullion. Another shipment will be received to complete March account. The indebtedness of the company embraces the expenses for the month of March, the total of which is not yet known. The expenses during the month of February were \$121,000. No dividends need be expected this month. Holmes reports a balance of \$2,092.02 in cash and \$55,373.98, face value of unsold bullion. The monthly dividend will be declared as usual. Bodie Consolidated has \$9,918.16 cash on hand and liabilities of \$1,230.48, with last month's expenses which are not yet advised. Mono has \$22,400 in cash and \$10,564.31, the assay value of bullion in transit; liabilities \$602, and the last month's expenses which are not yet advised. Alpha Consolidated reports on hand \$2,203.97, and is collecting a fifty cent assessment. Best & Belcher has \$36,588.08, or enough to run the mine several months without another assessment. Bulwer reports \$14,264.69 on hand. Utah has \$6,402.34 on hand, Ophir \$21,309.71, Hale & Norcross \$30,387.08, with \$2,908.50 additional to be received on the pending assessment. Occidental had a balance of \$1,801.27, Sierra Nevada \$14,153.86 and Gould & Curry \$3,078.54, with an assessment of 40 cents per share now being collected. Potosi has \$9,272.73 on hand, Chollar \$22,426.49 and Mexican \$15,436.25.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Barber's Mill, April 4, \$5,500; Odessa Mill, 4, \$14,500; Oro Grande Mill, 4, \$4,107; Calico Co., 4, \$11,020; Ibez, 4, \$8,500; Alice, 1, \$13,046; Hanauer, 1, \$3,780; Silver Reef District (for March), \$23,103; Hanauer, 2, \$3,210; Park City, 3, \$1,500; Hanauer, 3, \$2,743; Lead ore, 4, \$14,750; Alice, 4, \$13,262; Stormont, 4, \$3,200; Queen of the Hills, 4, \$2,900; Hanauer, 4, \$2,620. During the week ending April 3d there was shipped from Salt Lake fifteen cars bullion, 429,317 pounds; five cars copper ore, 148,850 pounds; two cars refined sulphur, 48,000 pounds.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MAR. 13.	WEEK ENDING MAR. 25.	WEEK ENDING APR. 1.	WEEK ENDING APR. 8.
Alpha.	20.	30.	25.	10.
Alta.	30.	30.	25.	30.
Andes.	10.	10.	10.	10.
Argentina.	1.10.	1.05.	1.10.	1.15.
Belcher.	1.10.	1.05.	1.10.	1.15.
Belding.	1.25.	1.50.	1.35.	1.40.
Best & Belcher.	1.25.	1.50.	1.35.	1.40.
Bullion.	35.	40.	35.	30.
Bonanza King.	1.25.	1.50.	1.35.	1.40.
Bodie.	1.35.	1.55.	1.40.	1.25.
Benton.	1.05.	1.05.	1.10.	1.10.
Bodie Tunnel.	1.05.	1.05.	1.10.	1.10.
Bulwer.	50.	60.	50.	60.
California.	2.00.	2.55.	2.05.	2.15.
Challenge.	1.05.	1.05.	1.10.	1.10.
Champion.	1.05.	1.05.	1.10.	1.10.
Chollar.	1.15.	1.15.	1.20.	1.20.
Confidence.	1.25.	1.25.	1.30.	1.30.
Con. Imperial.	2.00.	2.35.	2.05.	2.15.
Con. Virginia.	2.00.	2.35.	2.05.	2.15.
Con. Pacific.	1.15.	1.15.	1.20.	1.20.
Crowa Point.	1.05.	1.05.	1.10.	1.10.
Eureka.	1.05.	1.05.	1.10.	1.10.
Eureka Tunnel.	1.05.	1.05.	1.10.	1.10.
Exchequer.	1.05.	1.05.	1.10.	1.10.
Grand Prize.	1.05.	1.05.	1.10.	1.10.
Gould & Curry.	70.	80.	70.	80.
Goodfellow.	1.05.	1.05.	1.10.	1.10.
Hale & Norcross.	1.95.	2.60.	2.45.	2.75.
Holmes.	11.	11.	10.	7.
Independence.	1.05.	1.05.	1.10.	1.10.
Julia.	1.05.	1.05.	1.10.	1.10.
Justice.	1.05.	1.05.	1.10.	1.10.
Martin White.	1.05.	1.05.	1.10.	1.10.
Mono.	3.30.	3.90.	3.40.	2.80.
Mexican.	40.	60.	50.	60.
Mt. Diablo.	3.75.	4.00.	3.75.	4.20.
Northern Belle.	20.	25.	20.	15.
Navajo.	20.	25.	20.	15.
North Belle Isle.	20.	25.	20.	15.
Occidental.	30.	95.	80.	85.
Ophir.	80.	95.	80.	85.
Overman.	50.	75.	50.	60.
Potosi.	55.	75.	50.	60.
Pinal Con.	1.05.	1.20.	1.15.	1.25.
Sage.	1.05.	1.20.	1.15.	1.25.
Seg. Belcher.	70.	85.	70.	85.
Sierra Nevada.	10.	15.	10.	10.
Silver Hill.	10.	15.	10.	10.
Silver King.	10.	15.	10.	10.
Sydney.	10.	15.	10.	10.
Union Con.	50.	75.	50.	60.
Utah.	50.	75.	50.	60.
Yellow Jacket.	50.	75.	50.	60.

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Apr. 8.	110 Mexican.....	50c	
100 Alpha.....	65c	100 Mono.....	2.25
30 B. & Belcher.....	1.25	100 Ophir.....	75c
50 Bodie Con.....	1.15	500 Potosi.....	80c
100 Bulwer.....	60c	500 Savage.....	1.10
100 Chollar.....	90c	200 Sierra Nevada.....	45c
230 Confidence.....	1.10	451 Syndicate.....	50c
250 Gould & Curry.....	70c	100 Utah.....	60c
450 Hale & Nor.....	2.60	250 Union Con.....	45c
100 Holmes.....	7.87	100 Yellow Jacket.....	70c

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DIVIDEND NOTICE.

OFFICE OF

The Paradise Valley Mining Company.
San Francisco, California.

At a meeting of the Board of Directors of the above-named Company, held February 24th, Dividend No. 6, of Ten Cents (10c.) per share was declared, payable on SATURDAY, the 27th day of February, at the office of the Company. Transfer books will close on Thursday, February 25th, at 12 o'clock m.

W. LETTS OLIVER, Secretary.
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ASSESSMENT NOTICE.

Santa Anita Mill and Mining Company.
Location of principal place of business, San Francisco, California. Location of works, Nevada county, Cal.
NOTICE is hereby given, that at a meeting of the Directors held on the 31st day of March, 1886, an assessment (No. 9) of two cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, room 4, 309 California Street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 27th day of April, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 17th day of May, 1886 to pay delinquent assessment, together with costs of advertising and expenses of sale.
J. M. BURNETT, Secretary.
OFFICE—Room 4, No. 309 California Street, San Francisco, California.

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Co.
ASSESSMENT No. 52.
Levied.....March 27, 1886
Amount.....Forty Cents per Share
Due in office.....April 30, 1886
Sale Day.....Tuesday, May 26, 1886

ALFRED K. DURBROW, Secretary.

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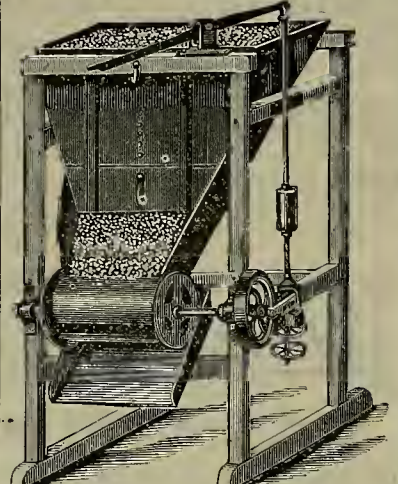
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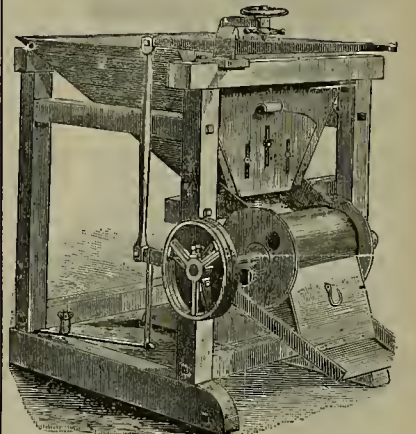
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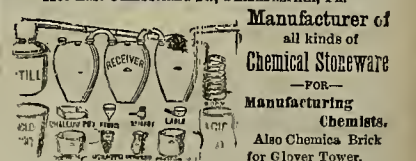
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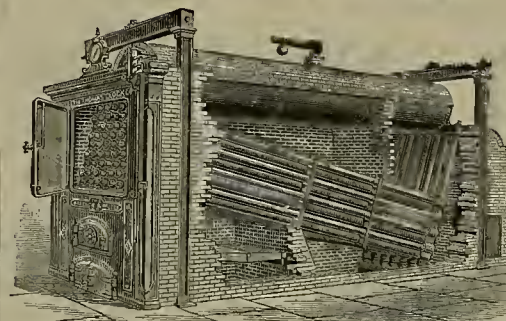
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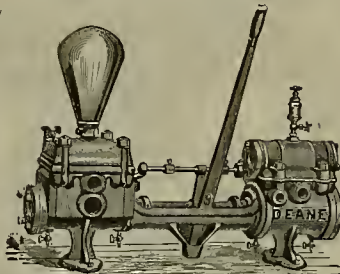
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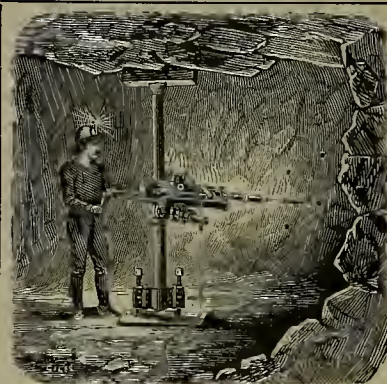
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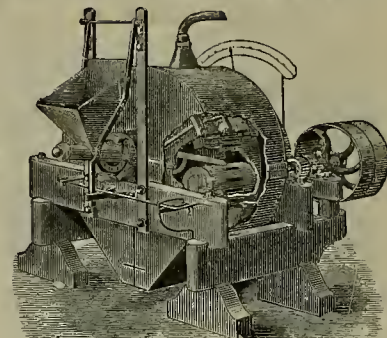
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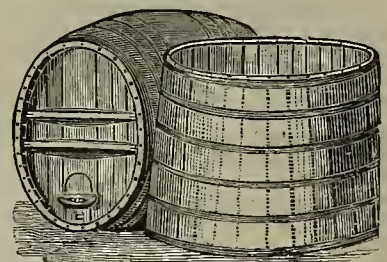
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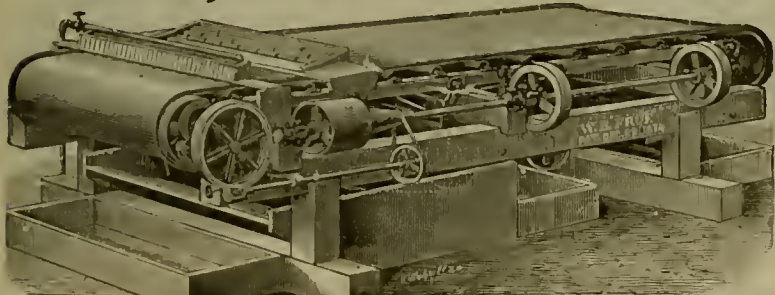
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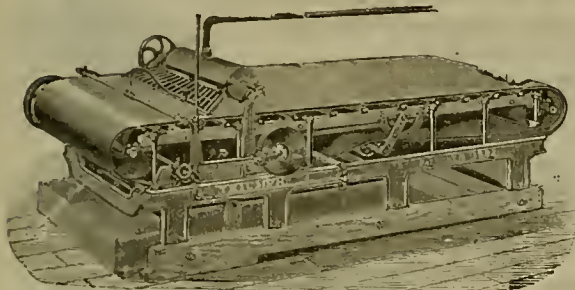
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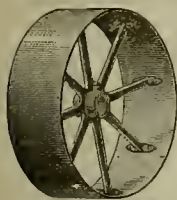
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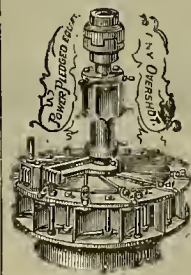
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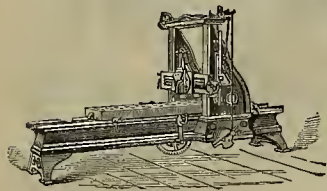
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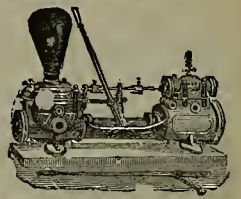
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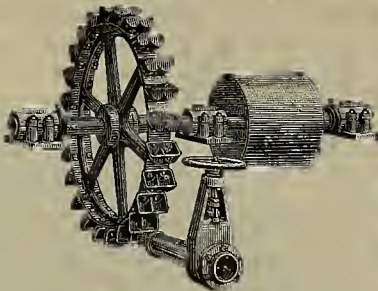
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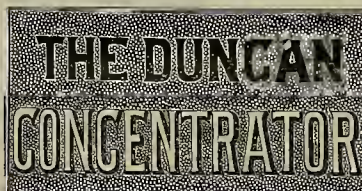
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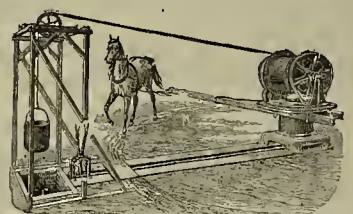
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over 300 pounds. At the ordinary speed of a horse, a
1,000-pound bucket of ore may be raised 120 feet per
minute. The hoisting-drum is under the complete con-
trol of the man of the shaft, and is capable of carrying
500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, APRIL 17, 1886.

VOLUME I:II
Number 18.

A New Circular Stamp Battery.

Some months ago we stated that a new stamp battery was being built in this city, and that in due time we would prepare an engraving of the new device. This we now do, and the engraving here presented is so correct an illustration of the battery that there is but little left for us to explain. The cut represents a 12-stamp battery—the medium size—they being made of three sizes, to wit: 8, 12 and 20 stamps. The points claimed for this battery are as follows:

1st. An iron battery, in every detail as to feed, tappets, stems, shoes, dies and boxes, the same as in the ordinary battery. It is simply a straight battery thrown into a circle and so constructed that the iron work is self-supporting, hence doing away with all wood-work; thus the structure rests upon its foundation more firmly than a wooden battery possibly can.

2d. The application of power is nearer the base than in an ordinary battery, consequently there is less leverage and less vibration.

3d. The foundation will not cost ordinarily over \$75.

4th. A 12-stamp mill will not require a larger building than an ordinary 5-stamp straight battery.

5th. More quartz can be crushed for power expended than by a straight battery, as there are no "end stamps" to impede work, and the discharge surface is greater.

6th. It is a good amalgamator on account of the circular motion given to the ore during reduction, as 85 to 90 per cent of the metal is retained inside of the battery.

7th. Foundation and power being ready, the mill can be erected and running in three days after it is delivered on the ground, thus saving in working time enough to pay the cost of a mill.

The total weight of a 12-stamp battery is 10 tons. The two largest pieces are the mortar, six inches thick, weighing three tons, and the box-plate with its cam step. These, when fastened together with six two-inch bolts passed through the six perpendicular columns, weigh four and a half tons, and form the base of the whole structure of six feet diameter. The cam is shod with steel and readily renewed.

The stamps weigh 550 pounds each, drop from five to nine inches, and 90 to 100 times a minute, as desired. The screens and trough encircle the whole battery. The power required is 10-horse. Daily capacity, from 20 to 30 tons (according to ore). Other size batteries have proportionate capacity, strength, power and price.

This battery is claimed by its experienced designer to be one of the most simple, efficient, economical and durable pieces of mining machinery in the market.

Two mills have been constructed (an 8 and a 12-stamp) upon this plan, and we are informed that they have proved themselves to be in every particular that which has been claimed for them.

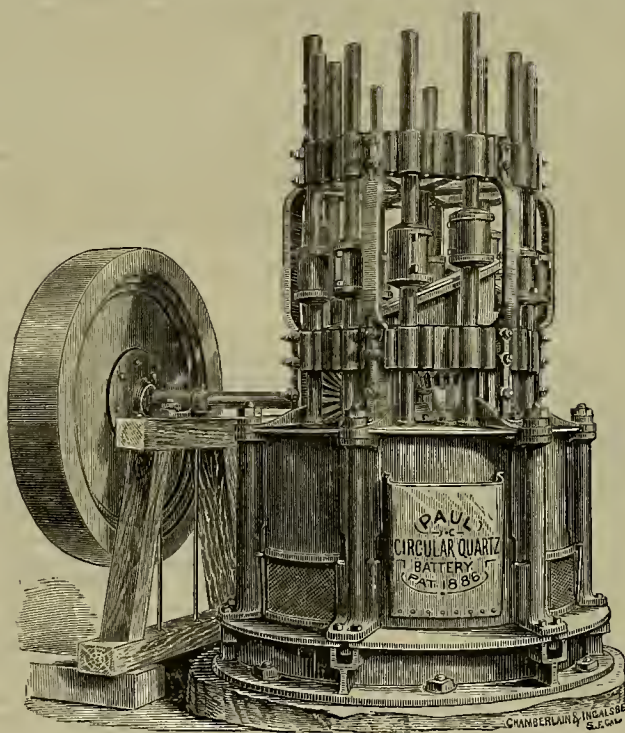
The patent belongs to the California Quartz Milling Company, having its office at room 20, Safe Deposit building. The patentee is Almarin B. Paul, who has had many years' experience with quartz mills.

The batteries are being made by the Judson Manufacturing Company and can be seen at their works across the bay, in practical working order.

Work at the Lick Observatory.

The Lick Observatory on Mount Hamilton will serve some practical purposes beneficial to every day life, as well as to aid in scientific observations of the heavens. Professor Edward S. Holden, the director, realizes that the observatory was established by Mr. Lick for the people of California, and he is arranging matters so that it will be of immediate benefit to them. In a few weeks arrangements will be perfected whereby the Mount Hamilton observatory clock will furnish the correct standard time for every railroad office throughout the State, and as far east on the Central route as

instruments. As the Mount Hamilton clock is to be connected by wire with the Central Telephone office in San Francisco the ticks from this office can be carried to every house in the city which possesses a telephone. The time can be obtained in this way: At the end of every minute, a gap of four seconds will occur. If the watch or clock of the person at the telephone does not show the correct time within five minutes, let him wait until the clock reaches one of the five-minute divisions. Then the first tick after passing the five-minute division will be followed by a gap of ten seconds. Signals will also be given for the hours. In this way the



THE NEW CIRCULAR STAMP BATTERY.

Ogden, and upon the Southern route as far as El Paso. A project is also on foot by which the ticking of the Mount Hamilton observatory clock may be heard at every telephone having connection with the telephone companies of this city. By means of a system of signals the correct hour may be obtained at any time of the day. This system Professor Holden inaugurated in Madison, and a similar system is now successfully carried on in Cincinnati. Arrangements have been made with Manager Towne by which the railroad offices will adopt the standard time as kept by the clock at Mount Hamilton. The clock at the observatory will keep absolutely the correct standard time. It is a fine piece of mechanism, and by the elaborate system of weights maintains the exact standard. Electric connection is made with the clock to San Jose, and thence to the railroad office at Fourth and Townsend, from which, as a center, the time is given every railroad office west of Ogden and El Paso. At noon and for two minutes thereafter each day the clock at Mount Hamilton will send out its signal. Dr. J. E. Keeler, for a number of years an assistant to Prof. Langley in the observations in the Pittsburg University, will take charge of the

correct standard time may be furnished to almost every house.

The ticking of the clock will not interfere with talking through the telephone. The establishment of this system of furnishing the correct time will prove of immense advantage to the community; as is well known there is frequently a variance of five or six minutes between the alleged standard clocks of this city, and a correct and universal exactness will prove of incalculable benefit to the community, especially to the business element.

In addition to this feature of the observatory, instruments have been ordered for automatically registering earthquake shocks. These instruments are from the design of Professor Ewing, who was formerly at the University of Tokio, in Japan, and had a very fine opportunity for testing them on the elevated plain of Japan, where earthquake shocks are so frequently felt. Prof. Ewing has perfected his system in a high degree and has lately made arrangements with the Cambridge Manufacturing Company of Cambridge, England, for putting such instruments on the market. A complete outfit for registering all small shocks, both in duration and amount, costs some \$330; and it is such an out-

fit that has been ordered for the Lick observatory. These instruments will be placed at the top of Mount Hamilton and thoroughly tried in that situation. If it should prove that earthquake shocks are not as frequent at the top of the mountain as in the valley below, the outfit may be moved to San Jose.

Mining Accidents.

A mining accident occurred at the Whitto mine on Kanaka creek between Jacksonville and Steven's Bar last week by which Stephen Vivian was badly injured. It seems that on the previous Friday while he was blasting with giant powder the fuse of a charge went out, failing to explode. Friday and Saturday he put in other blasts in the same ground which exploded, breaking the rock thoroughly. It was thought the first charge had also gone off with some of the subsequent ones. While working on the following Monday with a pick among the shattered rock he must have struck the unexploded powder as an explosion took place that tore a piece of flesh from his side, but without breaking any ribs, and bruising him badly about the head and body.

A miner named Jas. Smallfield had his shoulder hurt at the Zeile mine, Amador county, Wednesday of last week by the falling of a rock from the skip. The injury, however, was not very serious.

On the 13 inst., William Caddy, a miner working in the Idaho mine, Grass Valley was instantly killed by a large rock falling on him while he was standing asking a fellow miner named Mercum what time it was. The rock was part of the ledge which they were taking down, but was separated from the main ledge by a crevice. Though the miners were not aware of it, the timbers underneath the ledge gave no support to the rock. It fell a distance of about seven feet and fractured Caddy's skull and broke his neck, besides crushing his body. The rock in its descent narrowly missed killing Mercum, bruising his hand slightly as it fell.

Last week a cave occurred in the Hardscrabble mine on McAdams creek, says the Scott Valley News, completely burying Mr. Harry Mathewson, one Chinaman and partially so another Celestial. Mr. Mathewson's son, who was tending the derrick at the time, quickly gave the alarm, and in a short time a number of miners were at the scene of the mishap shoveling the dirt from off the entombed men. One of the Chinamen, who had only been caught in the cave by the foot, was quickly extricated. Mr. Mathewson, whose voice could be distinctly heard from under the heavy pile of earth, assured those that had come to his rescue that he was not badly hurt, but said the pressure was gradually becoming greater. Not a sound came from the Chinaman and it was thought that he must be dead or badly injured. After three hours of steady work, Mr. Mathewson was extricated from his perilous and uncomfortable position, but slightly injured. Work was continued, and in about three hours more the Chinaman was found, badly scared but slightly hurt. The cave was caused by the undermining of a set of timbers, which fortunately fell in such a way as to protect the men from the heavy bed of gravel above them.

FRANK YOUNG and partners sold a mining claim in Old Diggings district, Shasta county, for \$20,000 recently.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EBS.

Montana Mines.

[By Our Special Correspondent, R. G. HUSTON.]

Deer Lodge.

Deer Lodge is the county seat of Deer Lodge county, Montana, and is situated on the north side of the river of the same name, which, by the way, might well be called the river of many names; the headwaters being called Silver Bow creek. It runs under this name westward to the junction with German gulch; from there it is called Deer Lodge river to the junction with Little Blackfoot; from there it bears the euphonious cognomen of Hell Gate, probably given to it for the reason that it runs most of the way through a narrow, rocky canyon. After its junction with the Bitter Root river it is called the Missoula, and from its junction with the Jocko it is then called Clark's Fork of the Columbia. This is quite a string of names for one small river to bear in a distance of 250 miles. To a stranger to the geography of the country it would seem singular whence they all emanated, but they are all one and the same river, only called by different names.

Deer Lodge is evidently destined to become the educational center of the Territory, it being the seat of Montana College. This college is, according to the best information I can get, the best and ablest in the mountains, and is ably conducted by D. A. McMillan, who has devoted many years to that special line and being an enthusiast in his profession cannot fail in producing good results.

St. Mary's Academy is another of Deer Lodge's popular educational institutions, and is carried on by the Sisters in a very capable and thorough manner; this is, of course, only a general characteristic of all institutions under their management. These two institutions, in connection with a fine graded public school, should certainly be sufficient to provide the aspiring youth of this section with ample opportunity to improve their minds with useful knowledge.

The Territorial penitentiary is also located here, and at the time of my visit had about 100 transgressors of the law as inmates.

Eighteen miles further up the river, at the junction of Warm Springs creek, Doctors Mitchell and Mussighoff have charge of the Territorial insane. There are here now, exclusive of private patients, 130 inmates. The doctors own the Warm Springs, and take charge of the insane of the Territory on contract. They are careful, painstaking contractors, looking after the personal comfort of their patients in a very satisfactory manner.

At nearly every point of the compass in years gone by were good placer mines within 20 or 30 miles of Deer Lodge, and before the railroad was finished it was a general distributing point for those mines, and the volume of business transacted by her merchants then was simply immense. Much of this has now fallen off, partly on account of the placers being worked out and partly because all the smaller outside merchants have become direct shippers; yet the town is in a moderately prosperous condition. The increasing population in the different small valleys tributary to the Deer Lodge river and the main valley, in connection with the building of a town of 4000 inhabitants at the Anaconda smelters, makes a large increase in the population of the county, and consequently an increase in county seat business. There is also a fair showing for some quartz mines that are now being developed some 15 miles from town, in what is called the Oro Fino district. There are a number of persevering, energetic old-timers in here, and from what I can learn, there are some good properties. Should this district prove itself up by spring, it will add largely to Deer Lodge's future prosperity, as the main portion of these properties are held by Deer Lodge residents, and they have enough local pride in the welfare of their town to work to her interest to the fullest extent.

Nearly all of the secret societies have an organization here and have a good membership. The different religious sects are also well represented, so that the spiritual welfare of the town is surely not neglected. It is 45 miles south of west from Butte on the branch of the Utah Northern that was built to connect with the Northern Pacific; thus they have communication with the east and west coast by two lines, giving them ample accommodations for travel.

One property that I know of that changed hands a short time since, has been worked for years by a small, five-stamp, gold process mill and saving from \$9 to \$20 per ton, the assays running from \$25 to \$65. This looks to me like the "penny wise and pound foolish" manner of working a claim, but some men will not give in that there is any other way of doing things except their own, thus virtually robbing themselves. Why old experienced miners will be so pig-headed is a problem that I give up.

The company that bought this property are pushing, thorough-going modern miners, and are now going to work to make this property pay dividends, something it never has done, yet they have worked for years and have taken out over \$100,000. This property is in Deer Lodge county, and will be heard from as sure as twice two is four.

Since I visited Phillipsburg there has been a

company organized and incorporated to operate and develop some

Mines on Granite Mountain

Near the celebrated Granits Mountain mine of which I have spoken heretofore. I have not been able to learn whether they are operating on an extension of that or a parallel vein. They have telegraphed to Helena a strike of 2½ feet of ore similar to the old mine. The capital stock is \$5,000,000 and is officered as follows: A. M. Holter, president; Thos. Couse (of Drum Lummon fame), vice-president; H. M. Parchen, treasurer; Geo. H. Hill, secretary; J. K. Pardee, general manager. Another good producer of hulsion in this camp like the original Granite Mountain and with the same amount of ore developed as that mine has, would make the mining stock operators commence thinking that there was something in legitimate mining.

Glendale

Is located some 45 miles south of Butte on Trapper creek, and some six miles from Melrose station on the Utah Northern Railroad. This section was first heard of through the discovery of the Trapper lode in 1873; this mine is on the headwaters of the creek and lies close up to a very high spur of the main range of the Rocky mountains and between the Big Hole and Beaverhead rivers. It was a very rich deposit and still is worked quite extensively in the summer season, having a good concentrating ore; it is owned by the Hecla Consolidated Company. They have other mines that are operated in the winter time and do not or cannot run their concentrator in that season, it being a water-power. The Trapper is shut down at this season.

The smelters of this company are the mainstay of the town of Glendale. They are under the safe and economical management of Henry Kiuppenberg and give employment directly and indirectly to 250 men. Their output of bullion per day runs from eight to ten tons; this will approximate 3,000 ozs. silver, from 7 to 10 ozs. gold, and the remainder lead. The fact that this company have not failed to pay a dividend for a long term of years is proof positive that they have good mines as well as a close, economical manager. The smelter fumes make Glendale a rather unhealthy place to live in, as many people are afflicted with lead poisoning, yet they do not seem to care much for it, as they go off and stop in the valley a few days and patch up and come back and go to work again. The mine that supplies the major portion of ore is the Cleopatra. It was the buying of this mine for the consideration of \$100,000 that brought about a disagreement with Mr. N. Armstrong, who was virtually the originator and builder of the Hecla Consolidated Company, and at the time this mine was purchased the superintendent of the company. The company, most of whom live in Indianapolis, was dissatisfied with the price, and this tilt led to Mr. Armstrong's severing his connection with the company. Developments, however, have proven that his purchase was a wise one, and were it not for this mine the Hecla Consolidated's dividends would probably be few and far between. The mine is under the management of Mr. James Prout, an experienced miner, and is now running about 125 men. The old workings of this mine are a perfect labyrinth. They are now working through an incline, run on 30 degree grade down some 1800 feet, and are in the largest body of ore that they have ever worked in the mine. Tunnels and crosscuts are being run in different directions, and from developments thus far made they have ore enough in sight to run them for a long time, although it is my impression that if they do not commence timbering their mine in a workman-like manner somebody will lose their life. It is in a lime formation and ordinarily safe, but when too large a body is extracted without proper support there will sooner or later be a cave. By running a tunnel in from the foot of the mountain they could mine their ore much cheaper than they are now doing, as they now have a steam hoist to raise it from the bottom of the incline, and then run it down the mountain side to the ore-house by a cable tramway. This mine is at the highest altitude of any mine in Montana, being nearly 10,000 feet above sea level. They are now taking out 60 tons per day, which just equals the smelting capacity. The ore is sacked and transported by teams to the smelter. At the time I visited this place, they were running bob-sleds for five miles and the other five miles on wagons. They have other

Mines in the Same Vicinity.

One called the Ariadne has a fine body of concentrating ore, but, like the Old Trapper mine, is only operated in the summer season.

The Atlantis is pretty well worked out and the Sheep mine is well worked; a small quantity of low-grade ore being all that is left of this. The town at the mine is called Lion City and contains one general store run by H. Kappee, a hotel and saloon. George E. Tarhell has a fine billiard room and holds the office of justice of the peace to the general satisfaction of denizens of Lion City.

The Vipond District.

A few miles north of Lion City, has a number of promising prospects. Some ore is shipped from this district and good returns obtained; it is all taken out via Big Hole river and shipped at Divide. Dewey's Flat is another little town of large expectations, to which the Vipond district will be tributary. There are now two mills located at Dewey's Flat, but only one is running. The large one is owned

by the Monros Company, of New York, and has not been operated for a number of years.

There has been quite an excitement in the mining community in Montana about

Some Placer Mines

Discovered last fall some 50 miles further up the Big Hole river, near the old Gibbons hattle ground. To give these placers a better send-off than usual, Barney Hughes, one of the original discoverers of Alder Gulch, was among this party, and with the average placer miner stampeder, that would carry lots of weight. There is a strong probability of a large influx of people here in the spring as soon as the snow goes off, so that stock can live in that part of the country. It is at a very high altitude, up close to the main Rocky mountain range. I shall most likely take in this camp on my way over into Idaho next month, and will then be able to give a more lucid opinion concerning its merits or demerits, as the case may be.

The Pipestone District

Is just now looking up, a mine being sold there a short time ago for some \$30,000 and is now being incorporated. Developments have gone to show that a fine property is to be shown up here; gold predominates; the ore is not of very high grade but is in large quantities, so that it will, undoubtedly, be a good letter of introduction for the Pipestone district, which is about 25 miles southeast of Butte on the east side of main range.

A. W. Paul, of Three Forks, Gallatin county, has some very fine ore in a mine he has near that place. It is called the Bridgeville lode and he has just struck a small body of very high-grade ore, having from 6 to 10 inches of ore assaying from 200 to 500 ozs. silver and a large per cent lead. He says he has two feet of a second grade of ore ranging from 40 to 90 ozs. silver and the same per cent lead. This is certainly a good prospect, being a contact vein lying between lime and granite walls well defined. This is in Jefferson county within six miles of the town of Three Forks. This town was the base of operations of an English company who invested quite a sum of money in real estate there and built a number of modern houses which give the town quite a portentous appearance; but without Mr. Paul's mine turns out a veritable bonanza I am afraid the future of the town is not assured. It is within some five miles of the line of the Northern Pacific Railroad and without some side issue to bring it into prominence, the business will center on the railroad town. From this place over to Boulder is 25 miles of very poor country, fit for nothing but grazing purposes and so bleak and cold in the winter that stock would have a poor chance to make a living on it.

A San Francisco Mechanic on His Travels.

Pumping Machinery and Propellers.

EDITORS PRESS:—Since writing you last I have crossed the Atlantic, making my twentieth journey on the North Atlantic and am again in this wide and at present distracted country—distracted I say, because the present unfortunate war between labor and capital seems hourly to be widening and the end is not yet.

Since arriving in Cleveland, Ohio, in February, I have visited a large number of works of various kinds and find on nearly all hands indication of a more extended business than last year. Among other things, iron ship-building at Cleveland, Ohio, a thing which astonished me. There are now a half-dozen or more iron and steel "propellers" on the lakes, and I must maintain, so far as some acquaintance with the matter admits, that the practice there, both as to good work and processes, far exceeds the common standard. These propellers are huge vessels, flat-bottomed, with double skin arranged for water ballast, "engined" with all modern appliances, and carry from 2000 to 3000 tons. The cranks of the high and low pressure cylinders are not set at a right angle, but opposite. This is done to avoid vibration, and has been fully proved as a desirable arrangement.

I have recently returned from a trip to the Louisiana coast to examine the draining and reclamation machinery in use there. It will be impossible without drawings to convey any idea of the peculiar features of the pumps and other appliances. One thing, however, can be made plain, and that is the cost of the plants is very low, in proportion to capacity. The lifts are low and the amount of water to be handled is enormous.

The particular application is to rice plantations, the water being pumped both "out and in" at certain seasons as may be required.

The same system is applied to some extent to cranberry culture, the water being flowed over the fields when there is danger of frost and then pumped out again when the danger has passed.

The elevation of water, or water lifting it may be called, is no doubt in future to take its place in various agricultural pursuits in all parts of the country as well as in California.

The phenomenon of this city—the great "fact" so to speak, is natural gas. One is at a loss to know how to describe it or what to say about it. It is a miracle or seems so, and the sensess refuse to take it in as a commercial factor in the city's affairs. Near where I am stay-

ing a pipe 6 to 8 inches diameter extends up in this air 50 feet or more, and from the top issues a sheet of flame swaying in the wind and reaching 50 to 60 feet. The city is lighted up with a wild glare giving one the impression of a conflagration all the time. This and another on the other side of the river answer as escape pipes for surplus gas—running to waste. When one reflects that heat is power, and power is money, this waste seems a great loss, but I am informed the initial pressure is too great to permit "throttling" and these vents are necessary. A great share of smoke and "grime" of Pittsburgh has disappeared, the gas gives off no smoke. It is employed for every purpose where fuel is used, and for lighting besides. One gas company or a combination here have a capital of \$10,000,000, a fact which shows the enormous extent of this new and wonderful resource of this iron section.

J. RICHARDS.
Pittsburg, March 28th.

Winifred Mining District, Arizona.

EDITORS PRESS:—Winifred mining district is situated about 17 miles north of the town of Phoenix, Maricopa county, Arizona. There is a good level wagon road from Phoenix to the camp, with plenty of wood, and water for camp use here in the district and water for milling within 12 miles distant. The mines are of gold and silver bearing quartz, with granite and slate walls. The following is a brief description of some of the mines here, and I will describe others from time to time, as development progresses.

The Union Mine.

Is owned by Messrs. Shaw & Smith, of Phoenix. It has two distinct ledges. Shaft No. 1 is down 60 feet on a ledge of gold bearing quartz one and one-half feet wide at the surface and four and one-half feet wide at the bottom. The ore averages \$32 per ton as it is taken from the mine. Shaft No. 2 is down 20 feet on a ledge two and one-half feet wide of high-grade gold ore.

Raven Mine.

Belonging to J. M. Cotton, of Phoenix, is about one mile west from the Union. It has a shaft down 65 feet on a ledge 8 inches wide, and drifts run both ways along the ledge with ore that pays \$35 per ton free gold.

The Contentment Mine.

Owned by Messrs. Hamlin & Thomas, has a shaft down 65 feet on a ledge averaging from one inch at the surface to two feet at the bottom. The ore averages \$150 per ton and the granite on the hanging wall carries pay for about three feet in width. The granite will pay about \$20 per ton. This is a very promising mine and the owners know it, for they have four men working steadily.

The Lawrence

Is owned by W. L. Hastings. It has a shaft down 12 feet on a ledge 18 inches wide, the ore averaging \$118 per ton to \$75 per ton.

The Carbonate Hill mine is owned by Mr. Taplin, and has a shaft down 50 feet on a ledge 10 feet wide, paying \$10 per ton.

The Red Dog mine, owned by Messrs. Williams and Linville, of Phoenix, has a shaft down 40 feet on a ledge 12 inches wide, paying \$40 per ton.

The owners of most of these claims are poor men, but with capital this would be one of the best hulsion producing camps on the coast. As it is, however, there is not much going on, but if some enterprising man would put up a good custom mill with concentrators at Phoenix or Cave Creek, he would not only be considered a public benefactor, but would make money by the investment. What we want now is a mill to crush our ore—one that will mill our rock at reasonable prices.

W. L. HASTINGS.
Winifred, Arizona.

Colusa County Mines.

EDITORS PRESS:—Mining in this camp is booming. The Clyde mine, operated by Messrs. Snow, Smith, Shepard, Haskins, and McGrew, has one of Huntington's centrifugal roller mills in operation, which works like a charm. They are taking out \$1500 per month and only working eight men. This mine promises well. There is ore enough in sight to run two mills for two years. They intend to add two Frue concentrators in a short time as this mine is very rich in sulphurets, assaying as high as \$1200.

The Manzanita mine, owned by J. W. Burling of San Francisco, is looking well. This mine has a ten-stamp mill and one Wiswell mill in operation. They are working 15 men and are taking out from \$1500 to \$2000 per month. They have plenty of ore in sight.

The Empire Mill and Mining Company is a New York company who has bought the Empire mine formerly owned by Win. Cherry of this place who sold it lately for \$10,000. They have a large mill of New York pattern.

MINER.

Sulphur Creek, Colusa county, Cal.

THE Idaho mine, Nevada county, has just declared its 19th dividend. The mine is looking very well, much better than it looked last year. The shaft is now going down for the 1700 level.

MECHANICAL PROGRESS.

The Growth in Machinery Design.

Speaking of the growth of machinery design, the *American Engineer* of recent date very appropriately remarks:

In examining the multitude of illustrations and descriptions of the various machines offered through the medium of circulars and mechanical newspapers, one is continually impressed with the fact of how old ideas are revamped and worked over to present to the buying public something new and fresh. Each company is all the while rebuilding the particular line of tool or machine of which it is a specialty. The design is remodeled, the proportions changed, and all the various points of improvement enlarged upon and commented. Tools that 10 years ago were looked upon as heavy and massive are now set on one side because the demand has become positive for an increased product, and competition claims and will have a quantity of work per hour that those old proportions were not capable of performing. Manual labor has to be economized. It is done by increasing the efficiency of the tool; the depth of cut is doubled. Mechanism has provided that two cuts can be taken at the same moment; also, in addition, for certain classes of work boring is performed at the same time, so that the product of one man's labor is increased three and four fold. Then we see a change in the appearance; the old style of designing which utilized ribs, flanges with moldings, has given place to a plain, smooth surface. A simple box form, free from architectural ornaments, with corners rounded and composed of flat, broad surfaces, is now the fashion, and certainly is a great improvement to the eye, as well as in accordance with correct proportions. House architecture is one thing, but machinery should have an architecture of its own. Our readers have only to recall the gothic arch frames and entablatures of the slow-revolving engines of 25 years ago, with their curved ribs and twisted moldings, and compare them with the plain, simple, massive engines of to-day, with every pound of metal in its proper place for duty, and none wasted on external appearances. Then we find a continual growth of new machinery designed and adapted to perform operations and labor that before were done by hand, and in many cases, while executing such work very much faster, do it at the same time much more perfectly. There is also a large class of machinery offered that is brought forward, not because of being new in principle or design, but that its merits are based on superior workmanship, more perfect fitting of the details, improvement in the quality and kind of material used in its construction, and such simplicity in the working parts that a much lower grade of attendance can be used, thereby insuring a saving in the cost of the article manufactured. And last, but not least, the ever changing kaleidoscope of machines—engines, boilers, tools and apparatus—which have only the non-essentials changed, so that they can be offered to catch the inexperienced by claiming advantages that in reality do not exist. Engines, because of some wonderful proportion of a simple piston-valve, or the location of the same relative to the piston, or the peculiar advantage of a particular shifting eccentric, are the most economical and perfect engines ever offered, or ever will be; boilers, that on account of the peculiar manner in which the sheets are arranged in the shell, or a few tubes are placed, or a sheet-iron jacket is provided instead of a brick setting; great economy is insured in the amount of fuel required to evaporate water; grates for furnaces guaranteed to effect a saving of anywhere from 15 to 50 per cent in the pounds of coal required to perform the same duty—and so on through the whole list.

Mild Steel Plates for Steam Boilers.

The annual report of the Chief of the Bureau of Steam Engineering in the navy for 1883, contains the following remarks which cannot fail to be of much interest to all persons using steam boilers as well as to all engaged in the iron and steel trade. An especial interest attaches to the manifestly good results realized from the use of mild steel in place of iron in boiler construction, in the way of immunity from the great cost for repairs in the use of the latter material. The report states that: Previous to 1879-'80, boilers constructed of iron for the navy by outside parties and in the navy yards cost from 27 to 40 cents per pound, including grate-bars and other cheap fittings, and although made from the best iron procurable, would ordinarily require extensive repairs after a full cruise of three years, and very extensive repairs, or entirely new boilers after two such cruises.

With the mild steel now used by the Bureau in the boilers constructed in our navy yards for naval vessels during the last four years, we are making such boilers at an average cost of 20.68 cents per pound, and it is expected that this cost will be further reduced by the use of the improved appliances for banding and working this material which have been put up in several of the navy yards.

Thus far the Bureau has not had to make repairs to any extent upon boilers made of this material, but sufficient time has not yet elapsed to give them full trial to develop what the ordinary lifetime of such boilers will be.

The Nipsie, however, was the first vessel fitted with these steel boilers, and after returning from a cruise of over three years, during which time she steamed some 40,000 knots, her boilers giving most perfect satisfaction in their working, with not one dollar of expense in repairs for the cruise, and after being cleaned and some slight repairs made, were ready and are now again in service, in first-class condition.

The Bureau considers that the stand which it took, insisting upon a tensile strength not to exceed 60,000 pounds to the square inch, with a ductility in eight inches of not less than 25 per centum, together with its efforts to reduce to a minimum the possible number of riveted joints, for leaks, corrosion, etc., by demanding and obtaining the largest sheets that could be manufactured, has tended largely to raise the standards of excellence of material and the size of plates as now made by the principal manufacturers of the country, and that the stimulus thus given, with the honorable rivalry and zeal of our principal manufacturers using the superior products of American mines, will yet produce a still better material in maximum sizes of plates and at minimum cost.

SMOOTHING AND FLUTING STONE BY MACHINERY.—A new process for smoothing, polishing and fluting stone by machine power without the use of edge tools is now being tried in England. This process consists essentially in causing a revolving or reciprocating surface of iron to alternately bear against the surface of the stone to be worked, and then parted from it sufficiently to receive a layer of fresh sand and water between the rubbing surface and the rubbed. The rubbing surface is held down by a spring, but at intervals is raised from this rubbed surface by an eccentric cam. For fluting and similar operations a series of round bars of wrought iron are mounted in bearings and made to revolve; at the same time they are given a reciprocating movement. The block of stone to be fluted is placed on a trolley and run under the bars. Sand is sprinkled automatically over the bars or rollers as they revolve. For recessing, edge molding and similar purposes rubbing disks are mounted on vertical spindles arranged to lift automatically for about half a revolution in every four. Several different types of machines are now in actual operation. An advantage claimed for this process of working over hand labor with hammer and chisel, or machine work where cutters are forced into the stone, is that the surface of the stone is left perfectly smooth and "unstunned," and better capable of withstanding atmospheric influences.

MACHINERY AND ITS POSSIBILITIES.—Those who entertain the opinion that the possibilities of labor saving machinery are nearly exhausted and that the whole field of art industry in which it may be advantageously employed has been already covered by inventive genius, are greatly mistaken. That the achievements of human ingenuity have been wonderful, goes for the saying, and there are reasons to believe that future triumphs in this direction will be even greater and more fruitful. We are forced to this conclusion by reason and analogy. Who would have believed only a very few years ago, that the difficult and complicated processes which are now every day being wrought out by machinery in various branches of manufacture would have been possible? Thus it is that the problems unsolved by one generation become accomplished facts by another. Who shall say that what now seems impossible and improbable may not be successfully attained by those who will come after us? In the hands of the modern scientific inventor matter becomes almost miraculously endowed with life and intelligence, and with great accuracy performs those functions which the most skilled manual labor executes but slowly and imperfectly. The educated mind which stands behind this matter and directs its movements is the Aladdin's lamp which conjures up the mighty genii and compels its slave to do its bidding, however extravagant the master's demands may be.—*Manufacturer's Gazette.*

AN ELECTRICAL HEATING STOVE.—Among recent French inventions is an electrical stove, a peculiar feature of construction of which is that the wires are led through apertures formed in plates of refractory clay and plumbago. These plates are not inclosed, but are left exposed, so that the air can circulate very freely through the apertures, where it comes in contact with the red-hot wires. Wire bobbins are inserted in the apertures, each bobbin forming part of the electric circuit and all being connected for quantity. These bobbins are heated by the passage of the current and serve to heat the air as it passes to and fro over them.

A SAFETY WHEEL for roller skates has been patented by Mr. Rossiter I. Towle, of Gunnison, Col. Prongs project downward from the rear end of the skate, with a series of apertures for receiving a pin, with a roller mounted between the prongs on the pin, and a series of apertures for receiving a locking pin for locking the roller in place, and enable the skater to easily maintain his equilibrium.

INCREASE OF STEAM POWER.—Sir Lyon Playfair in his recent address before the British Association, said the steam power of the world has risen during the past 20 years from 11,500,000 to 29,000,000 horse-power, or 152 per cent.

SCIENTIFIC PROGRESS.

Effects of Impurities on Metals.

Mr W. Chandler Roberts-Austen, F. R. S., chemist of the Mint, delivered lately at the Royal Institution, London, the first of four lectures upon "Metals as Affected by Small Quantities of Impurity." He said that metallurgy has to deal at once with large masses and with small particles, for the influences of the latter upon the former is out of all proportion to their relative quantities, and their action may be chemical, or physical, or both. Minute impurities in metallic copper would render ocean telegraphy impossible. Geber proved that the "cry" of tin, or the noise which it makes when bent, can be removed by purification. Arsenic in the most minute proportion will restore the cry of tin, and its action in this respect has been known at least since the third century of our era; arsenic makes tin as brittle as zinc. The fact that such small proportions of foreign matter so alter the character of metals tended more than anything else to confirm the alchemists in the doctrine of transmutation, and encouraged them in their attempts to make gold by artificial means. A little arsenic in melted lead will make it more fluid, so that when poured down an inclined plane, say, of white paper, the lead will roll itself into small shot; with the arsenic absent it will merely chill in a black streak upon the paper. The speaker proved this by experiment, and said that it required but twelve one-hundredths of one per cent of lead to produce the effect.

Zinc, said the lecturer, melts at 412° C., and standard gold at about 900° C., but if less than 0.2 per cent of silica be added to gold, it will soften in the flame of a candle. This was also demonstrated by experiment. He stated that it may not be generally known that copper can be gilt as well by the application of an alloy of lead and gold to its surface as it can by an amalgam of mercury and gold. On the application of heat the copper absorbs the lead, and the gold is left on the surface. The process is recorded in a papyrus of the third century, now preserved at London.

The alchemists, he said, through several successive generations down to the year 1746, authoritatively taught it to be a fact that all metals were composed of mercury and sulphur, combined in different ways; and those of them who claimed to have made gold almost invariably said that they had done so "by the aid of a powder received from a stranger." Dr. James Price, of Guildford, a Fellow of the Royal Society, was the last of the alchemists who believed in the transmutation of the baser metals into gold; he lived in the eighteenth century. Raymond Lully was confined in the Tower by one of the English kings, in order that he might make gold for the mint.

Even the illustrious Robert Boyle believed in the transmutation of metals, because in the usual orthodox way he had "received from a stranger" a powder which would change 1,000 times its weight of gold into a baser substance, and he did not see why the operation might not be reversed. He had probably made what is most dreaded at the mint, an alloy of gold and lead. The lecturer here melted down one hundred sovereigns, and cast a little of the molten metal into a small bar, to show that the metal was strong and malleable and tough. To the remaining greater bulk of the molten gold he, however, added a trace of lead, and cast the mixture into a large thick bar, which, when almost cold, and when held in the palm of the hand, broke into pieces upon being tapped with a hammer. A small trace of lead, he said, will reduce the breaking strain of gold from twenty tons to five, as indicated by a testing machine.

Palladium will absorb 900 times its volume of hydrogen gas, and give it out again when heated.

The remarkable discovery has recently been made that an alloy of rhodium and lead will absorb nitrogen and oxygen, and when heated give them off with explosive violence as gun cotton does. This was also shown by experiment.

Laws of Motion.

The following are the results given in *Nature* of a very elaborate mathematical inquiry, which Prof. N. Joukowski has recently made into the laws of motion of a solid body, having hollows filled up with a homogeneous liquid. Various shapes of hollows filled with liquid have been considered, as also the case of a vortex motion of the liquid having interior friction. Some phenomena of the interior motion of the liquid itself, in the case of the solid body when caused to rotate, were verified by experiments which proved conformable to the theory; they have shown that in a body whose rotation velocity is decreasing from its surface to the center (e. g., a glass sphere filled with water, and which is brought into motion) the molecules flow from the poles to the equator, and vice versa where the rotation being suddenly stopped, the speed of rotation is on the decrease from the center to the circumference. The general conclusion of the inquiry is that if we have a hollow body filled with a liquid, and this system be brought into motion, its motion will tend to reach a limit characterized by one of the chief axes of inertia of the body taking the direction of the chief momentum of the communicated motion, and the whole system will rotate around this axis as a single body, the speed of rotation being constant and equal to

the quotient obtained from the division of the force applied by the momentum of inertia of the system with regard to this axis. M. Joukowski asks, does it not explain the circumstances that our planets, notwithstanding the variety of their occasional primary velocities, all rotate around their axes of inertia?

TEMPERANCE IN SCIENCE.—A certain temperance in science is obligatory. As mere wealth of possessions cannot guarantee happiness, neither can a superfluity of learning insure wisdom. When this body from overfeeding grows plethoric, its vital energies subside and its life is endangered. The intellect may be mischievously crammed with science. How much we know is not the best question, but how we got what we know, and what we can do with it; and, above all, what it has made of us. The tendency of training now is to subordinate the soul to that which should be merely its endowment and adornment; to turn the thinker into a mere walking encyclopedia, text book, or circle of mechanic arts; not to produce the highest types of man. What ridiculous and pitiable creations are these—an authority in physics who cannot speak the truth? a leader in natural history who is given over to the torments of envy? a god in chemical research sick of some false quotation? a youthful prodigy of mathematical science tottering with unelastic steps and outstretched arms to grasp his future fame? Yet no one will deny that the temperate pursuit of any branch of science has a tendency to produce such characters, by elevating to undue importance the individual accumulation of scientific facts and scientific theories, to the neglect and depreciation of that spirit of truth which alone can inspire and justify an earnest study of the material universe. Reflect that it is as true of science as of religion, that the mere letter of its code threatens its devotee with intellectual death, and that only by breathing its purest spirit can the man of science keep his better character alive.

THE PITTSBURG OIL AND GAS YIELD TEMPORARY.—Professor Lesley has recently published an interesting paper on the "geology of the Pittsburgh coal region," in which he speaks of the yield of oil and gas as follows: "I take the opportunity to express my opinion in the strongest terms, that the amazing exhibition of oil and gas which has characterized the last 20 years, and will probably characterize the next 10 or 20 years, is nevertheless, not only geologically but historically, a temporary and vanishing phenomenon—one which young men will live to see come to its natural end. And this opinion I do not entertain in any loose or unreasonable form; it is the result of both an active and a thoughtful acquaintance with the subject." Concerning coal, however, the professor entertains quite different views. He says that the amount of coal in the Pittsburgh region is estimated at about 30,000,000,000 tons—an amount practically inexhaustible, at least for centuries. During 1884, 11,000,000 tons were taken from the Pittsburgh bed—an output of about 60 per cent of the whole bituminous coal production of the State, and about 33 per cent of the shipments of anthracite.

THE ORIGIN OF THE AMERICAN DOG.—Dr. A. S. Packard has contributed to the September number of the *American Naturalist*, a paper of universal interest on the origin of American dogs. He concludes that, though the impression that the domestic dog of the Old World has descended from the wild species distinct from the wolf, may be well founded in America, the evidence tends to prove that the Esquimo and other domestic varieties of dogs were domesticated by the aborigines and used by them, long anterior to the discovery of the continent by Europeans, the varieties in question originating from the gray wolf or the prairie wolf. The subject is fully illustrated by quotations from the accounts of the early explorers. This opinion is supported by the well established fact that the domestic dog, and gray as well as the prairie wolf will hybridize.

MASSSES OF SNOW MOVED BY WIND.—At a meeting of the Geographical Society of Paris, M. Schrader read a paper on the masses of snow moved about by wind among mountains. These masses are not moved about by chance—they obey very simple laws, which cause them to be deposited at spots where the wind is diminished in intensity, and give them forms which may be easily analyzed if the quality of the snow, the force and direction of the wind, and the contour of the mountain be taken into account.

MAGNETIC DISTURBANCES AND CYCLONE STORMS.—Balfour Stewart and William Lant Carpenter have made a preliminary comparison between the dates of cyclonic storms in Great Britain and those of magnetic disturbances at the Kew Observatory. Finding that in 30 cases compared, 23 presented a distinct magnetic disturbance preceding the storm, for the most part, by somewhat more than a day, the investigators consequently intend to pursue the subject exhaustively.

IS THERE A MAGNETIC SENSE?—A European observer, Dr. Ochrowski, believes that he has found evidence of the existence of a "magnetic sense." It is stated that by hanging a magnetic tube, called a hypnoscope, from the index finger he realizes peculiar sensations, somewhat resembling the effects produced by the action of the air in front of an electric machine.



A. T. DEWEY.

W. B. EWER.

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Passing Events.

The unusual heavy rains of the past week or two have prevailed nearly all over the State. In some places this abundance of water has been a hindrance to mining operations; in others it has been of advantage. In former days all the rainfall was utilized in working surface deposits, but now the water is applied for power in working quartz machinery, though of course some is still used in sluicing, etc. Still, abundant water seasons are important to the mining interests, though not so much so as was the case years ago.

In printing a four-page supplement to the Press this week we devote considerable space to describing the largest custom metallurgical works on the coast. The article will be read with interest by miners who have ores to work or sell, or hollion to refine.

More interest is being taken just now in both manganese and chrome ores than for years past. Those owning manganese deposits will do well to see that they keep their records of title good, for if the low freights continue, a better demand will spring up. The same is the case in the matter of chrome ore.

Our California gold quartz mines are in demand just now and intending purchasers find difficulty in obtaining outfitted mines, properly developed, at what they call anything like a reasonable price. These people will have to take hold of prospects and develop them, the same as our own miners have to do.

The Lixiviation Process.

Its Success at Lake Valley.

Some time since, in our editorial columns, we called attention to the adoption of the lixiviation process at Lake Valley, New Mexico. The successful treatment of these ores has always constituted one of the most difficult metallurgical problems ever met. Smelting, raw milling and concentration, have each in turn failed to give satisfactory results, and it has remained for the leaching process alone to meet the requirements of economy and high percentage of extraction.

The process used is the Russell process, and both mine and mill are under the management of Dr. F. M. Endlish, whose name is most familiar as a chemist and mineralogist.

The unusual difficulties presented by the Lake Valley ores called for mechanical and chemical treatment of an almost extraordinary character, and the present mill extraction of 87 per cent has been reached only after numerous changes, and the treatment of over a thousand tons of ore. The rate of increase in the percentage extracted is now about one per cent for each 100 tons treated, and in the treatment of the next 500 tons will probably reach 92 per cent, although the ore is crushed through a 16 screen, and chloridized with only 7 per cent salt. The mill is probably the most automatically arranged of any so far constructed. With the exception of a small amount of flue dust there is no handling of the ore from the time it enters the Blake crusher until it appears on the cooling floor. By a contrivance of Dr. Endlish's, even the flue dust from the dust chambers of the chloriding furnaces is delivered at the lower end of the furnaces mixed with the coarse, hot ore. From the cooling floor, the chloridized ore is conveyed by three elevators starting from three different points, under the cooling floor to bins over the ore tuhs, each holding 20 tons.

The apparatus of the leaching department consists of six ore tuhs, each 12' diameter and 5' deep; five precipitating tanks, each 9' diameter and 9' deep, and three storage tanks of same size. Also, a Johnson 15-inch filter press, and a small Knowles pump for handling the solutions. Each ore tuh is also provided with an Allen lead-lined syphon pump. These are on the ejector principle, and seem to maintain a constant vacuum underneath the filters, and so increase the speed of leaching, and also deliver the solution at any desired point.

The ore tuhs are loaded to a depth of four and one-half feet deep, which is equal to 20 tons for each tuh, or 120 tons in all. By means of the huns the loading of 120 tons can be accomplished in three and one-half hours.

The total cost of treating the ore by the new leaching process, after it leaves the cooling floor, is 74 cents per ton for chemicals, and from 25 to 40 cents per ton for labor, the last item varying universally as the number of tons treated per day.

The mill has a leaching capacity of 120 tons per day, and a chloridizing capacity of 80 to 90 tons. The crushing capacity, owing to the poor quality of the rolls, and the hard character of the ore has so far been only 60 tons.

The grade of the ore treated is 14 to 20 ounces, and the total expense of treatment about \$5 per ton. The mining and hauling are extremely low, being about \$3.75 per ton.

The company will therefore be able to make a fair profit on their 14-ounce ore, of which there are immense quantities.

In short, as far as economical management and the successful treatment of low grade and unusually refractory ore is concerned, the example of the Sierra Grande Co. is worthy of imitation.

PRACTICAL HYDRAULICS.—Mr. Randall's book on Practical Hydraulics will very shortly be ready for delivery. There is still one more number of the series of articles to appear in the Press, when the subject will be concluded. As a work of reference on this subject, and one which will save much labor in calculations, Mr. Randall's book will be invaluable. Copies of the work can shortly be furnished to those ordering them.

ABOUT 400 tons of chrome ore have been shipped East from Livermore, Alameda county, this season, by rail, and shipments will continue as long as low freight rates warrant.

Cost of Mine Supplies.

There is one great advantage the miners of the State of California have in pursuing their work, and that is the comparative cheapness of ordinary mine supplies. In the other States and Territories on the coast they are generally higher, owing to the cost of transportation. This State is now so well settled up and has such railroad facilities with distributing centers that our miners can get their supplies readily, quickly and cheaply.

The price of supplies has an important influence on the mining industries, more so than most people imagine. Processes which yield a fair profit in localities where labor and supplies are to be had at low rates, would result in a loss in a great portion of the mining districts in what is known as the Far West, and processes and methods developed in other regions must be modified to suit the local economical conditions or be abandoned. The higher cost of mining supplies in many camps as compared with the prices asked at centers like San Francisco, St. Louis, or Chicago is almost entirely due to expense of transportation. This often exceeds the original cost of the article transported, and sometimes the relative values of materials in their technical applications.

Steel may be worth four times as much as iron at commercial centers, but as the freight on each metal is the same, steel at a mining camp may be worth but twice as much as iron. If, for a given purpose, steel will do three times as much service as iron, the latter will be employed at centers of commerce, while the former will be more economical in the mining regions.

The price of articles of uniform quality, such as candles and quicksilver, is a gauge of the rates of transportation and an index of the cost of supplies excepting such as the locality itself may supply. Salt is naturally cheap in this State and at Salt Lake, while at long distances from the deposits or manufacturing, it is extremely expensive. Last summer some of the Butte, Montana, mines came near closing down because the freight rates were so high on the salt they were compelled to use in beneficiating the ores. In some places in Utah salt has been sold for \$8 per ton when it was selling for \$100 per ton in Arizona. It might be clearly more economical to amalgamate raw ore in Arizona containing a considerable amount of rebellious silver minerals, which it would be folly not to roast if found near the salt deposits of Utah. Similarly it will make a great difference in the system of timbering a mine whether timber is worth \$6 or \$100 per thousand feet.

In what are called supplies are included coal, charcoal, wood, timber, iron, steel, candles, explosives and sundries; among sundries are lubricating oil, hardware, ice, water, etc. The Census Bureau obtained statistics of the cost of these articles all over the United States and have tabulated statements on the report. With 589 deep mines reported in the different States and Territories, the total cost for coal for a year amounted to \$17,397; charcoal \$13,400; wood, \$1,752,203; timber, \$859,172; iron, \$118,376; steel, \$71,718; candles, \$248,485; explosives, \$502,792; sundries, \$1,097,719. The total cost of supplies for the 589 mines was \$4,681,267. The number of mines reported includes only a fraction of the deep precious-metal mines of the country, but also includes most of the great consumers. A single one of the larger Comstock mines spends more for supplies than scores of small mines do elsewhere.

It is probable that nearly one-half of the total is included in the above statement, and the whole amount expended in this way is between nine and ten millions annually. There is no relation between consumption of supplies and production. The cost of mine and mill supplies on the Comstock in the census year amounted to \$3,018,839; of this \$2,205,832 was for mine use, and \$813,026 for mill use. The greatest expense was for wood—\$1,500,000; timber cost \$500,000, and explosives \$208,000.

THE Consolidated Virginia and California Mining Company has to pay the Suro Tunnel Company a royalty of \$10,000 for the mouth of March. The hollion product for March was \$141,000, subject to the discount on silver. The net earnings for the month, above expenses, were \$7000. The company has \$30,000 in the treasury. The grade of the ore being worked is low at present.

Foundry Notes.

Fulton Iron Works.

The Fulton Iron Works are engaged at present on considerable marine work, something of which they seem to make a successful specialty, for they have much more of it to do than other establishments. They have now on hand a contract for the new ferry boat for the San Diego Ferry Company, which is to ply between the city and the peninsula on the opposite shore of the bay. The new boat is 100 feet long and 26 feet beam. She is being built here and will steam down. The engine has a 16-inch diameter cylinder, with five-foot stroke; boiler 59 inches in diameter, with fire box 68 inches long and 54 inches wide.

They have just shipped this week a small engine for a fishing steamer to be used at Astoria. She is a high-pressure boat.

A compound engine is also being built for a launch which is to go to Mexico. The cylinders are 7½ and 14½ inches.

They have completed and ready for delivery two compound engines for two lumber schooners for the coast trade. These are 11 and 12 by 18-inch stroke; the boilers are of steel, 8 feet in diameter.

A set of compound engines is being built for a new steamer to take the place of the lost Planter, owned by the Inter-Island Steam Navigation Company, of Honolulu. The cylinders are 12 and 22 by 18 inches, and the boiler is 8 feet 6 inches in diameter. This is the fourth set of engines built by the Fulton Works for this company.

A short time since they fitted out the steamer Falcon, for the Wilmington Transportation Company, the second job of the same kind for this company. They had a contract for the boat, engines, boilers, etc. She was guaranteed a speed of 7½ knots, but made 9 knots on her trial trips and is capable of 10 knots. The engines are compound 12 and 22 by 18 inches.

They are building a dredging machine for the Government to be used in the improvement of rivers emptying into Suisun and San Pablo bays. The hull is 71 feet long on deck and 65 feet on the bottom; beams, 36 feet; depth, 8 feet. There are 26 heavy floor timbers 8x12; and 9 keelsons 12x12. The frame for supporting the crane for the bucket-ladder is to be built of steel and iron in the form of an arch springing from one side of the hull to the other, and on the extreme forward end. The main driving engines are fitted with reversing link motion and have cylinders 12 inches in diameter and 18 inch stroke. This dredger will have 31 buckets, each with a capacity of four cubic feet. Auxiliary engines are provided for raising and lowering the bucket-ladder, etc. There are two locomotive boilers 22 feet long and 60 inch diameter of shell. There are the usual steam pumps, etc.

Among the miscellaneous work in the shops are four large sized Huntington mills, to go to quartz mines. They are building a Tustin pulverizer which is going to St. Petersburg, Russia, for a gold mining property. They have also, ready for shipment, a complete 20-stamp mill for the Argo mine, New Mexico. They are also just finishing the ice machinery for Merry, Faull & Co.'s packing establishment, and have more or less small work on hand.

THE BIG BEND TUNNEL, of which we gave a brief account last week, was cut through on Monday. The river is still high, and they will have to wait for lower water to complete the entrance of the tunnel and make connection with the river bed. In next week's Press we shall give a full description of this great work, with suitable engravings.

THE PACIFIC GALENA SMELTING furnace, made by the Pacific Iron Works, of this city, is in use on lead ores all over this coast, and has been very successful. This form of water-jacket furnace seems to be preferred at the principal smelting works, including that of the Selby Smelting and Lead Company, at Vallejo Junction, in this State.

HARTSFELD FURNACE.—A 20-ton Hartsfeld portable furnace has been shipped by the Hartsfeld Furnace Co. of Newport, Ky., to W. T. Garratt & Co. of this city, agents and licensed manufacturers for the Pacific Coast. We gave a detailed description and illustration of the furnace in the Press of October 24, 1885.

Working Gold and Silver Ores—No. 2.

The Chilian Mill.

In continuing his description of the arrastre and Chilian mill, and the methods of working ore with these appliances in Mexico, Mr. E. C. Van Blarcom says:

The Chilian mill is to all intents and purposes a mill-stone set on edge and arranged so it will revolve in a circular track; the axis upon which it revolves is pivoted at one end and the horses or mules are attached to the other. A circular excavation is first made in the ground some eighteen feet in diameter and about one foot deep. Directly in the center of this excavation a hole is dug at least four feet deep. In this hole a piece of timber ten inches square (b', Fig. 3) is set, plumbed and made secure with masonry.

Before setting the stick a hole should be bored in one end and a piece of two-inch round iron (c', Fig. 3) is let in. An iron collar is placed around the end of the timber to keep it from splitting.

Around the periphery of the circular excavation a fence or wall of flat stones or plank (d', Fig. 3) is erected. The enclosure is paved with the flattest stones procurable, care being taken to make it as nearly level as the roughness of the stones will permit. Directly in the track of this grinding wheel large stones, at least eighteen inches thick, should be laid. If small stones were laid here, the weight of the grinding wheel would crush them.

The crushing wheel (x, Fig. 3) may be of any size; for a small hacienda one five feet in diameter and 14 inches wide on the face would be appropriate.

Through the center of the wheel a hole is cut for the axle; this hole may be cut round when the axle is intended to work directly on the stone, or it may be cut square and a wooden hushing to reduce the wear on the axle put in. Where it can be had, the axle (a', Fig. 3) should be made of hard wood, but a piece of eight inch-square and even lighter timber will serve the purpose; it should be made round where it bears on the grinding wheel. The wheel is kept in place, on the axle, by washers made of two-inch plank (y, Fig. 3), and two one and one-half inch round iron linch pins (z, Fig. 3). The pin, c, in the upright post in the center of the mill, works in a two-inch hole in the axle; grease may be used on this pin, but none should be used on the wheel, as it would be continually dropping into the ore—this would affect the quicksilver during amalgamation.

The Settler.

The settler is shown in Figs. 4, 5 and 6. It has a tank j (Figs. 4, 5 and 6), 6 feet long by 18 inches wide in the clear. Three sides of the tank are built up of masonry and the fourth is closed by a two-inch plank, p (Fig. 5), in which holes are bored for discharging the contents. These holes are fitted with wooden plugs, l (Figs. 4 and 5). Water is introduced into the tank through the pipe k (Figs. 4 and 5). If preferred, the pipe may be on one side.

The slimes to be washed are dumped on the platform at one side of the tank. Stairs lead up to the platform, as shown by the drawings.

In Figs. 4 and 5, m, are planks built into the side walls to hold the end plank, p; n, vertical box to receive tailings; o, sluice for running off tailings; q, amalgam traps in discharge sluice.

The inside of the tank must be made smooth to facilitate collecting the amalgam when the charge has been washed. This can be effected by polishing the lining with a smooth stone as it is drying.

The Retorting Furnace.

A quicksilver flask cut off square at both ends, v (Fig. 8), is built into a masonry support. The upper end is flared and is fitted with a circular iron plate t, through which a number of holes about one-quarter of an inch in diameter have been bored. The lower end of the pipe drops into a chamber 17 inches square and 11 inches high. The pipe dips into water which is let into the chamber through the pipe, r, and overflows through the opening s. Another tank, having the neck cut off, is used as the retort proper, w (Fig. 8). It is placed open end down, on the plate t. An opening, u (Fig. 7), shown by the dotted lines, is left in the side of the furnace. This opening extends to the floor of the chamber and is used for handling the vessel put under the mouth of the tube to catch the condensed quicksilver.

While restoring is in progress it should be dammed up above the water level.

Figs. 9 and 10 show a convenient strap to be used when any of the timbers used are built, i. e., made of more than one piece.

A piece of half inch by one and one-half inch iron is cut into suitable lengths; one end is dumped and a suitable thread cut on it; through the other end a hole is bored sufficiently large to take a bolt the same size as that made on the other end.

These straps are placed around the timber—the bolt end of one going through the hole in

The process given here is not to be considered a perfect one, although in theory it is. As the mechanical losses are large it is not to be recommended for the reduction of fine gold ores on a large scale; but, for this prospector, man of small capital or as an expedient in out-of-the-way places it can be recommended.

The ore should be spalled to about egg size, and carefully sorted. The assorted ore is crushed to a size which will pass through a sieve of nine meshes to the square inch—pea size. This crushing is effected either by hand or a Chilian mill (a sec-

silver is added by straining it through two thicknesses of coarse cotton cloth, the shower of quicksilver being evenly spread over the charge. As the grinding progresses the remainder of the charge is added, and the balance of the quicksilver. The total amount of quicksilver added should be in excess of the amount calculated to be necessary to take up the gold; it is desirable to keep the amalgam soft and well disintegrated while the grinding continues. Water is added from time to time as the charge thickens.

When the charge is thoroughly ground it should be in the state of medium thick mud, but not plastic; there should be enough buoyancy in the mass to keep the mercury suspended. Care must be taken not to add too much water, as it will materially impede the grinding.

Small portions of the charge are taken out from time to time and washed down in a horn spoon. These "assays" will show how the grinding and amalgamation is progressing, and also show if it is necessary to add more quicksilver. If the amalgam in the spoon is at all hard more quicksilver must be added immediately.

The time necessary to complete the amalgamation depends entirely upon the ore treated. If the gold is coarse the amalgamation may be completed in 12 hours; whereas, if the gold be very fine it may be necessary to continue the grinding for 72 hours. From 12 to 72 hours may be given as the limits for the time of grinding. The safe way will be to grind to absolute slimes but ordinarily a point will be found beyond which grinding will be unprofitable—this is a matter for experiment on the part of the amalgamator.

When the amalgamation is completed the slimes are removed in tubs or barrels to the settler. (Figs. 4, 5, and 6.)

After each grinding the arrastre is scraped clean with a horn spoon; but, as a certain amount of amalgam will find its way into the tamping between the stones in the pavement of the arrastre it will be found profitable to occasionally dig out the clay tamping and pan it down. When an arrastre is to be abandoned the whole bottom should be taken up and panned down. Unless the mules are in very good condition they should not be run for longer shifts than six hours. When working on the arrastre the mules should be blindfolded. The slimes from the arrastre are dumped on the platform of the settler.

Before commencing the operation the settler is partially filled with water; slimes and water are added from time to time until the tank is full. A constant agitation must be kept up. This is best effected by two men, stripped to a breech-clout getting in the tank; by a constant motion of the feet and legs the quicksilver is separated and settles to the bottom. From time to time the plugs are removed and the tailings drawn off. The sluice through which the tailings are drawn off is provided with riffles or catch basins for catching any amalgam that may be mechanically carried over.

After the entire charge has been settled the amalgam and sulphurets, which have collected in the bottom of the settler, are pounded down by hand in a pan or batea to separate them. When the amalgam has been thoroughly washed it is strained through a canvas bag to remove the superfluous quicksilver. This quicksilver will always be found to contain a certain percentage of gold; it is very desirable, as it takes up gold much more readily than pure quicksilver.

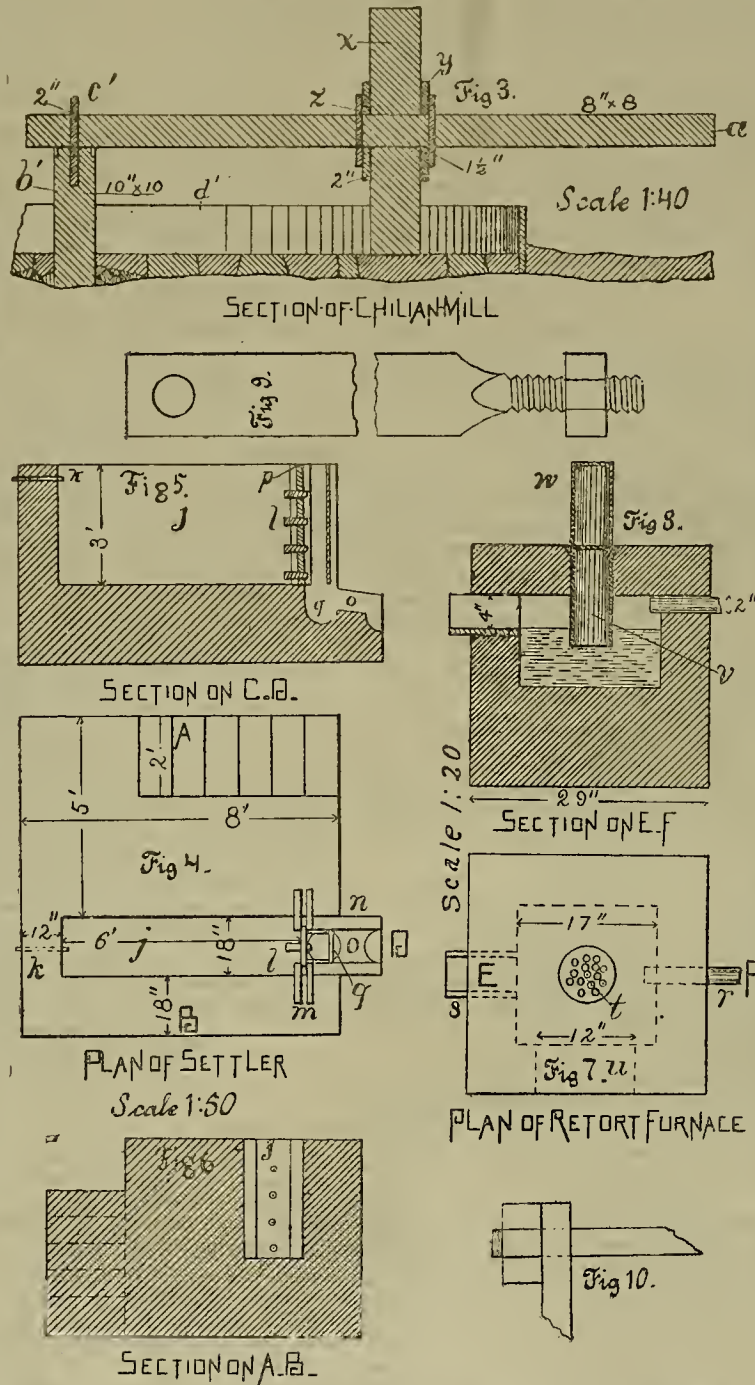
The Furnace for Retorting

Is shown by Figs. 7 and 8. If there be enough amalgam to fill the retort, it, the retort, is lined with coarse straw paper and then the amalgam is packed in tight and rammed down with a block of wood and a hammer. The retort is now placed, mouth downward, on the perforated plate which covers the tube leading down into the water. The joint is carefully luted with a mixture of clay and wood ashes, and then a coating of this mixture about one inch thick is applied to the entire retort. The retort is gradually heated up with a charcoal fire. Great care must be taken with the fire, for if the retort is heated too rapidly an explosion is liable to occur.

When the clay luting is thoroughly dried and shows no cracks, the fire is increased until the entire retort is covered with live coals. Care must be taken not to fire so hard as to melt the gold. When the amalgam to be retorted is not sufficient in quantity to fill the retort, it is rolled up in a piece of coarse cotton cloth, placed inside the retort and retorted as above.

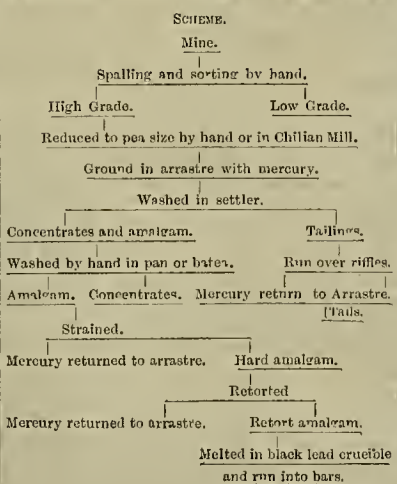
To keep the fire from falling off the furnaces a wall of small stones or bricks is built up around the outer edge of the furnace. The volatilized quicksilver passes down and is condensed by the water in the bottom of the furnace. A pan or other vessel should be placed in the water directly below the tube leading to the retort to catch the quicksilver as it condenses. A stream should be kept running while the retorting is going on.

If more amalgam is made (regularly) than can be conveniently retorted in one retort, the size of the furnace may be increased and any number of retorts run at the same time. The gold which comes from the retorts still contains a small percentage of quicksilver, which is removed by melting down in black-lead crucibles. The gold can now be run into bars.



the end of another, and by means of nuts they are set up tight.

Reduction of Gold Ores in the Arrastre.



tion of which is shown in the drawings Fig. 9). When the crushing is done in the Chilian mill the cobbed ore is distributed on the track of the crushing wheel in a layer about three inches thick; after the wheel has passed over the ore it is stirred up with a rude rake. The crushing and stirring is continued until the ore approximates the desired size, when it is drawn toward the center of the mill and a new charge is introduced. After crushing the ore is sifted, and any that is not fine enough is returned to the mill for further crushing.

The practice is to crush the ore as it is needed, but an amount might be crushed and kept in store. Two or three animals are used at a time on the mill. After being reduced to pea size the ore goes to the arrastre. For an eight foot arrastre (Figs. 1 and 3 given in last week's PRESS), to be run by one mule, the charge is 450 pounds.

About one-half of the charge is placed in the arrastre at the commencement of the operation, enough water being added to thoroughly moisten the ore. With the charge is added two or three ounces of quicksilver. The quick-

PRACTICAL HYDRAULICS.*

NUMBER 26. COPYRIGHTED.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

$$v=4.862 \text{ feet.}$$

Whence, $q=12,833.25 \times 4.862=62,395.26$ cubic feet.—Ans.

INTERPOLATION.

For the purposes of interpolation where the extremes are not far apart, in Table 27, the velocities, without any considerable error in practice may be assumed proportionate, either to the sines of slope on one hand, or to the hydraulic mean depths on the other.

Ex. 112.—The coefficient of roughness of bed being $n=.012$, the hydraulic mean depth .5, the extreme sines of slope $s=.0015$, and $s=.005$, what, in a regular arithmetical series will be the six interpolated velocities?

Cal.—By Table 27, for $n=.012$, and for the given hydraulic mean depths the velocities due the given slopes are 3.134 and 5.625 feet per second. Then $(5.625-3.134) \div 7=.356$ common difference.

Whence, the interpolated velocities will be 3.490, 3.846, 4.202, 4.558, 4.914 and 5.270 feet.—Ans.

Ex. 113.—The coefficient of roughness of bed being $n=.012$, the given sine of slope $s=.0007$, the extremes of hydraulic mean depths 1 and 2, what, in a regular arithmetical series, will be the three interpolated velocities?

Cal.—By Table 27, for $n=.012$, the velocities due the given hydraulic mean depths 1 and 2, are 3.360 and 5.302 feet. Then $(5.302-3.360) \div 4=.4855$ common difference; whence the interpolated velocities will be 3.845, 4.330, and 4.816 feet.—Ans.

MEAN VELOCITY.

To find the mean velocity of an open stream of water, various devices, as tight tin tubes, loaded each at one end, so as to float vertically in still water, and as nearly so in streams as the current will permit—the Pitot tube, patent logs, etc., are employed. Wooden floats, of nearly the specific gravity of water, are, however, mostly used in common practice. By these the surface velocity is taken; thence the mean velocity is determined by calculation based on experimental data.

Having chosen a straight section of a stream free as possible, to be found from eddies, roughness and foulness of bottom, and having divided the stream into sections parallel with its course, cast into it wooden floats, note the time taken by a float in each section to pass through a given distance, as 100 feet, and thence determine the surface sectional velocity per second. Divide the sum of the several velocities of the floats by their numbers; the result will be the mean surface velocity of the stream per second; whence, the mean velocity for the mean depth of the entire cross section can be calculated as above stated.

CENTRAL SURFACE AND CORRESPONDING MEAN VELOCITY.

Having made several trials with floats, as above described, let the greatest velocity, well established by any one of them, be taken as the central surface velocity. For the central surface velocities, from five-tenths (.5) of a foot to six (6) feet, the corresponding mean velocities have, by the aid of experimental data, and the following empirical formula of Prony, viz.:

$$v=V \left\{ \frac{V+7.782}{V+10.345} \right\}, \quad (286)$$

been computed, and the results arranged in Table 30.

In Eq. (286), v denotes the mean velocity, and V the central surface velocity of a stream of water.

TABLE 30.

Central Surface and Corresponding Mean Velocities of Streams.

Central Surface Velocity, Feet.	Mean Velocity, Feet.	Central Surface Velocity, Feet.	Mean Velocity, Feet.
.5	.382	3.5	2.852
1.0	.774	4.0	3.284
1.5	1.174	4.5	3.721
2.0	1.584	5.0	4.165
2.5	2.000	5.5	4.609
3.0	2.424	6.0	5.058

Ex. 114.—What is the quantity of flow in a stream in which the cross section is 50 square feet and the central surface velocity 3 feet per second?

Cal.—In Table 30, opposite the given central sur-

face velocity 3 feet, find in mean velocity column 2.424 feet. Then

$$2.424 \times 50 = 121.2 \text{ cubic feet per second.} \text{—Ans.}$$

Rough Approximate.—A rough approximate is readily found by taking one-half the product of the surface width, central depth, and central velocity of a stream.

This rough approximate rule is based on the assumption that the cross section of stream is parabolic, and the mean velocity equal to three-fourths (.75) of the central surface velocity.

Ex. 115.—The surface width of a stream is 25 feet, the central depth 4 feet, and the central surface velocity 1.5 feet, what is the flow per second?

$$\text{Cal.}—25 \times 4 \times 1.5 \div 2 = 75 \text{ cubic feet.} \text{—Ans.}$$

QUANTITY OF WATER REQUIRED FOR VARIOUS MINING PURPOSES.

Hydraulic Mining.—Hydraulic mining, properly, comprises all classes of mining in which the metallic substance sought is separated from its earthy mass or matrix by means of water. The term, however, as employed in California, is, for the most part, restricted to that class of mining in which a stream of water is projected under great pressure from a nozzle against a deep gravel deposit or earthy formation for the purposes of disintegrating the mass, thence freeing the gold and carrying off the debris. The relation of the quantity of water employed to that of material removed varies in different mines and in different parts of the same mine.

Duty of an Inch of Water.—This phrase involves in its meaning the work of disintegration; but as the projecting head is variable from 50 to 350 feet and upward, the phrase seems to refer chiefly to that portion of the work performed by the water in carrying off the debris in a sluice, the grade of which is usually 6 inches per 12 feet. Experience shows that the duty of a 24-hour miner's inch, under a 7-inch head, equivalent, as shown by Table 8, to 2.230 cubic feet flow in twenty-four hours, is in the lower portions of certain mines as follows:

	Cubic Yards.
North Bloomfield Mine.....	3.5
Milton Mine.....	2.4
Excelsior Mine.....	2.0
Gold Run Mine.....	3.5

In the upper portions of the same mines the duty of the miner's inch was much greater, say 5 to 10 cubic yards.

Thus, at the Gold Run mine, for six years to November 1, 1881, 4,389,791 cubic yards were worked with 1,124,367 miner's inches of water; whence the duty of per inch was 3.9 cubic yards.

In the State Engineer's report to the legislature of the State of California, 1880, the estimated inch duty is as follows, viz.:

	Cubic Yards.
Yuba River Mines.....	3.5
Bear River Mines.....	3.0
American River Mines.....	4.5

One instance is brought to the attention of the writer showing the inch duty to have been 19 cubic yards.

Drift Mining.—Drift mining consists in excavating the lower material of a gravel mine by hand, raising it through a shaft to the surface, or carrying it by wheelbarrows and cars through a tunnel to a dump, whence it is shoveled or piped into a sluice to be freed of its gold, and thereupon carried off as debris. As the larger cobble, bowlders and barren blocks of rock are usually left in a drift mine, and the material broken smaller than in hydraulic mining, a correspondingly less quantity of water is required for working an cubic yard.

The duty of a 24-hour inch (2.230 cubic feet) in this class of mining varies according to the character of the gravel, whether hard and cemented, clayey or sandy, from 3 to 20 cubic yards.

Quartz Mining.—The contents of one ton of quartz, in its normal condition in the lode, is estimated at 13 cubic feet, and at 20 cubic feet when the quartz is broken, as it usually comes from the mine. Adopting the lode measurement it is seen that a cubic yard of quartz is $27 \div 13 = 2.08$ tons nearly.

Experience shows that the duty of a miner's inch as follows:

Duty of a miner's inch (under 4-inch pressure) in the reduction and amalgamation of silver ores in a "stamp silver mill," Nevada, 3.25 cubic yards or 6.76 tons; in the reduction and amalgamation by riffles, or copper plate, in "stamp gold mill," California, 5.78 cubic yards or 12 tons.

Duty of miner's inch (under 7-inch pressure) in the former case (silver) 4.3 cubic yards, or 8.93 tons; in the latter case (gold) 6.65 cubic yards, or 15.88 tons.

The volume of water to that of ore is, in working

silver ores, Nevada, 19.5 to 1; in working gold ores, California, 11.1 to 1; in working copper ores, Lake Superior, 20 to 1.

QUANTITY OF WATER REQUIRED FOR PURPOSES OF IRRIGATION.

As the area of land is usually expressed in denomination of acres, a convenient unit of measure for irrigating purposes is that quantity of water which will cover one acre one inch deep. This quantity is 3,630 cubic feet.

The total depth of irrigation, as practiced in California, varies for different soils and products from two to five feet.

Ex. 116.—It is proposed to irrigate 1000 acres of land, 50 inches in depth, in 100 days, by means of a canal whose fall per mile is to be 1.056 feet ($s=.0002$), coefficient of roughness of bed $n=.017$, bottom width equal to slant width of side, and ratio of depth to base of bank as 1:2, what will be the dimensions of the canal?

$$\text{Cal.}—3630 \times 50 \div 100 = 1815 \text{ cubic feet; } 1815 \times 1000 = 1,815,000 \text{ cubic feet per day; } 1,815,000 \div 86400 = 21,007 \text{ cubic feet per second.}$$

Assume, by way of trial, the hydraulic mean depth to be 1.25. Then, in Table 27, for $n=.017$, the velocity for hydraulic mean depth 1.25 is 1.386 feet per second; whence, $21,007 \div 1.386 = 15,16$ square feet, area of cross section of canal.

By Table 28, for hydraulic mean depth 1.25, the sectional area is 16.59 square feet, under trapezoid 1:2. This approximate is sufficiently near to meet the requirements of practice. The dimensions of the canal then, as per Table 28, are: side=bottom=4.426 feet; depth=1.980 feet.—Ans.

If greater accuracy be required, proceed as in the solution of Ex. 99.

Ex. 117.—How many acres can be irrigated 40 inches in depth in 75 days, by means of a semi-hexagonal canal five feet deep, the fall per mile being 1.584 feet ($s=.0003$), and the coefficient for roughness of bed being $n=.025$?

Cal.—By Table 28, it is seen that the hydraulic mean depth and the area of a semi-hexagon five feet deep, are respectively: 2.5 feet and 43.301 square feet.

By Table 27, for $n=.025$, fall per mile 1.584 feet, the velocity corresponding to hydraulic mean depth 2.5 is 1.872 feet per second.

$$\text{Then } 43.301 \times 1.872 = 81,059.72 \text{ cubic feet per second; } 81,059.72 \times 86400 \times 75 = 525,265,378.5 \text{ cubic feet; } 3,630 \times 40 = 145,200 \text{ cubic feet per acre; } 525,265,378.5 \div 145,200 = 3617.5 \text{ acres.} \text{—Ans.}$$

MEASUREMENT OF THE POWER OF WATER AS A MOTOR.

The unit in the measurement of power is a foot-pound—that is, the amount of energy necessary to raise one pound weight vertically through a distance of one foot. On the other hand, one pound falling by the force of gravity through a distance of one foot, generates a foot-pound.

The amount of energy required to raise one pound vertically 550 feet, is equal to the amount of energy necessary to raise 550 pounds vertically one foot in height.

This amount of energy rendered in one second is termed a horse-power—that is, 550 foot-pounds rendered in one second, is the value of a horse power in mechanics.

The weight of a cubic foot of fresh water is estimated in practice at 62.5 pounds.

Ex. 118.—How many horse-power will 10 cubic feet of water, applied to an overshot water wheel, 40 feet diameter, render, the efficiency of the wheel being 75 per cent, and one foot being allowed for clearance?

$$\text{Cal.}—40-1=39 \text{ feet, effective head; } 62.5 \times 10 \times 39 \times .75 \div 550 = 33.24 \text{ horse-power.} \text{—Ans.}$$

TABLE 30.

Limiting Velocities in Open Streams.—Jackson's Hydraulic Manual.

	Feet per Second.
For the worst or most sandy soil.....	2.5
For sandy soil generally.....	2.75
For ordinary loam.....	3.
For firm gravel and hard soil.....	4.
For brick work, ashlar, or rubble in cement.....	5.5 to 7.5
For hard, sound, stratified rock.....	10.
For very hard homogeneous rock.....	14. or 15.
Limits usual for canals.....	1. to 4.
Limits for irrigating channels.....	1. to 3.
Limits for sewers and brick conduits.....	1. to 4.5
Limits for self-cleansing sewers and drainage pipes.....	2.5 to 4.5

Remark.—The importance of the data, given in Table 30, will be seen at a glance.

Thus, if a velocity exceeding 2.5 feet per second be given a stream in very sandy soil, destruction by erosion of the bed of the canal will ensue; while on the other hand, if the velocity shall not exceed one foot per second at first, the canal will be liable to become choked up by the growth of vegetation.

* This series of articles will shortly be published in book form by Dwyer & Co., Publishers of the MINING AND SCIENTIFIC PRESS, 252 Market St., S. F. Subscribers for the book will be filled in the order in which they are received.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

OIL STOVE.—Hedry L. Howse, assignor of one-half to Wm. H. Wiestler, S. F. No. 338,842. Dated March 30, 1886. This invention relates to certain improvements in oil stoves, with the object of making them more effective in operation and more convenient in use. The patent covers several improvements on a former device by the same inventor.

GATE.—M. B. Gordon and Wm. Y. Gordon, Davisville, Yolo county. No. 338,401. Dated March 23, 1886. This is one of that class of gates which are adapted to be operated by the passing traveler without putting him to the necessity of alighting from his vehicle. It consists of a combination of devices so as to provide a gate which is adapted to be readily opened and closed, and when closed to be securely fastened.

AUTOMATIC CABLE ROAD SWITCH.—Arthur F. Brown and Francis E. Stratton, S. F. No. 338,823. Dated March 30, 1886. This consists of a throw or switch-rail for the main and branch tracks, a movable throw-plate for the slots of said tracks, and mechanism operated by the approaching grip-car for operating the throw-rail and slot-plates. The object of this invention is to provide a means for switching the car automatically, thereby dispensing with the services of a man at the switch-point.

FAUCET.—David and Theodore Morris, S. F., assignors to Morris' Manufacturing Co. No. 338,353. Dated March 23, 1886. In the ordinary construction of faucets they are either made so that the valve must be opened and closed by hand, with the danger of flooding in case the valve is left open, or, if made self-closing, they are operated by a spring which is apt to get out of order. In this invention they use a balance valve so arranged that it shall have sufficient pressure to close itself when the operating lever is released, and is at the same time so nearly balanced that the valve may be easily opened under a heavy pressure.

BOAT ATTACHMENTS FOR VESSELS.—Pietro Micheletti, S. F. No. 338,859. Dated March 30, 1886. This invention consists of a buoy, or float, connected by a loosely paying line of suitable length with the ship or vessel, and seated loosely in a chamber or pocket, from which it can be floated by the action of the waters; and it further consists in details of construction relating to the construction of and attachments to the buoy, or float, and its connection with the vessel. The invention has various objects. The principal one is to indicate the fact that a vessel has sunk, and its location; another is to provide for the saving of life; and still another is to provide easy access to the sunken vessel and a means for getting ready appliances for raising her.

RECEPTACLE ATTACHMENT FOR DASH BOARDS.—Michael Fahey, Oakland. No. 338,833. Dated March 30, 1886. This is a bag or receptacle adapted to be readily attached to and detached from the dash-boards of vehicles. The bag is made of any suitable material and provided with a spring clamp flap on its back, adapted to fit over the top of the dash-board. The bag is stiffened by means of spring hars let into the material, and passing under the bottom, up the back, and into the clamp flap, where they unite with a crossbar, forming a spring frame for the clamp flap, flexible or pliable enough to allow it to fit over the dash-board and still to keep it sufficiently stiff for a good appearance. The interior of the bag may be divided into suitable compartments, and the partition walls are made of some elastic substance, as are the ends of the bag. The object of the invention is to provide a bag or receptacle for conveniently containing and carrying parcels, letters, etc., and which, by reason of its construction, is entirely out of the way, and yet perfectly secure in its position.

WINDMILL.—Syranus Standish, Pacheco, Contra Costa county. No. 338,799. Dated March 30, 1886. This invention relates to that class of windmills in which two vanes are employed to affect the necessary regulating of the wheel, one of said vanes being arranged in a vertical position, parallel with the wheel, and the other vane being mounted on a horizontal shaft and adapted to be oscillated by power transmitted from the vertical vane from a horizontal plane on which it lies inactive, to a vertical plane in which it receives the force of the wind and throws the wheel out of action. This invention consists in a novel arrangement of these two vanes and the power-transmitting devices between them. It consists, further, in a novel turn-table on which the wheel and vanes are arranged; in a novel and peculiarly-located bracket in which the turn-table is mounted and which is adapted to permit the most convenient arrangement of the pitman with respect to the tower employed, and on a novel hollow slotted stem, forming part of the reciprocating mechanism; said stem being the seat for the wire or cord which throws the mill out of action, and forming, also a novel connection with the pitman of the pump.

USEFUL INFORMATION.

Painting Tin Roofs.

A correspondent of the American Artisan writes: "I see in one of the recently published books on building, the direction not to paint a tin roof until it has been on at least thirty days. This delay was supposed to be necessary in order to have the tin washed clean, and so get rid of the grease, resin, etc. In the eastern part of the country any such delay results in giving the tin a slight coat of red rust. This, of course, makes the paint flow beautifully. Everybody likes it. But when the tin once gets started there seems to be no end to its rusting. It goes on all the same whether covered with paint or not. It is all very well for the tinman, but how is it for the man who pays the bills? What we want to do is to make the roofs last as long as possible with the least amount of repairs. Paper, tar, asphalt, iron and other kinds of roofing are coming into use largely because of poor tin roofs. It is for the interest of every tin man to put on as good a roof as possible and make it last. Now, to do this, rust must not be allowed to start. The roof ought to be painted before the plates begin to show red. Then the roof is safe, and if properly cared for there is no danger that it will give out before its time. I hold that such a roof, painted at proper intervals, will last forever."

Some persons seem to forget that there are two surfaces to a sheet of tin, says a correspondent of the *Tinner and House Furnisher*. They see the upper surface and take care of that, but forget that the under surface equally needs to be kept free from moisture. Water on the under side of a tin roof will produce rust about as quickly as water on the top surface. To prevent sweating and condensation of moisture on the under side of a tin roof is a point which must be guarded against by thorough ventilation, if we would make the roof last.

AN ELECTRICAL LETTER CARRIER.—An Eastern inventor is at work upon a plan for the transmission of letters and small parcels by electric tubes controlled and governed by electrical appliances. The tubes are to be made of brass and laid underground; through these the metallic carriers for letters or other business documents will be transmitted at convenient points. Compressed air will be admitted to move the carriers, and also the electric current, which is an essential adjunct to this system. The general plan of operation will be known as the consecutive, special and exchange systems, which will be adapted for transmission of mail between the postoffice and street letter boxes; packages of money, etc., between banks; papers, etc., from court rooms to lawyers' offices; packages from shops to customers' houses, and communications between police stations, etc. This plan differs materially from the mere pneumatic tube system. In the new arrangement of electrical devices and switches the carriers are sent from the main tube leading from the central point to the various branches with a great saving of expense in tubing. One line of tube will suffice for all stations, just as do the water mains.

LEAD PIPES IMBEDDED IN CEMENT.—Some of the peculiarities acquired by leaden pipes after having been imbedded for a period of five years in a layer of Portland cement, are described in the *Mettalarbeiter*. It appears that a red coating was noticed from one-twenty-fourth to one-eighth of an inch in thickness, the appearance of which corresponded with that of oxide of lead, as it is usually delivered in commerce. This coating was carefully removed, and the particles of lead removed with it were separated by means of a magnifying glass, and the specific gravity of this powder, carefully defined at 59 degrees F., and reduced for a vacuum, varied between 8.002 and 9.670. This variation is explained by the presence of the metallic lead, mixed in the oxide of lead, and carbonate of lead. Qualitative analysis demonstrated that this powder contained oxide of lead, lead, carbonic acid, water and traces of calcium. The formation of this peculiar coating on the lead pipe is believed to be owing to the action of the oxygen in the air, in union with that of the lime contained in the mortar.

WAX SPOTS ON CARPETS.—Wax can be taken out of carpets by several very simple methods. Lay a thick piece of blotting paper over the wax and apply a hot iron to it; the paper will absorb the wax that is melted by the heat. If, in doing this, any dark traces should remain on the carpet, rub a little benzoline carefully on, drying the same with a cloth; Another method is to drop a few drops of boiling water immediately on the spots and dry after with a cloth; care must be taken that the colors in the carpet will stand hot water. Green is the most dangerous color to fear.

ANCIENT LOCKS.—The general principles of a lock found among the ruins of the great temple of Karnak, and which was in use more than 40 centuries ago, have served as the foundation for most of the inventions of recent times. The locksmiths of China, we are told, had, centuries before the birth of Christ, perfected a lock out of which a sharp bamboo thorn would cut and

strike the hand of any one wrongfully tampering with it. The end of this bamboo thorn was steeped in a poisonous decoction, and, should the luckless thief escape death, he would be maimed for life. But this story is hardly entitled to full belief, for the reason, as the Chinese themselves claim, that as gunpowder was manufactured by them at the time, a Celestial safe holder could easily render the thorn lock harmless by the aid of a few grains of powder.

A VALUABLE DISCOVERY has been made, whereby the faded ink on old parchments may be so restored as to render the writing perfectly legible. The process consists in moistening the paper with water and passing over the lines in writing, a brush, which has been wet in a solution of sulphide of ammonia. The writing will immediately appear quite dark in color and this color, in the case of parchment, it will preserve. Records which were treated in this way in the German museum in Nuremberg 10 years ago are still in the same condition as immediately after the application of the process. On paper, however, the color gradually fades again; but it may be restored at pleasure by the application of the sulphide. The explanation of the action of this substance is very simple; the iron which enters into the composition of the ink is transformed by reaction into the black sulphide.—*Paper World*.

ART OF KNITTING STOCKINGS, ETC.—A new method has been devised for knitting and completing a stocking which is described as follows: Knit a toe and foot-heel to the line where the heel is to be joined to the main web, then take a previously knit heel-piece and running or picking a course of stitches thereof, taking one or more courses from the upper edge of the said heel-piece, upon a sufficient number of the needles of the knitting machine, still holding the stitches of the main web, then knitting the leg-heel, then cutting across the foot-heel just below the line where the heel-piece is joined to the main web, then joining by any suitable means the side edges of the heel-piece to the edge of the foot-heel cut from the main web and entirely closing the heel.

TO FIND THE SPEED OF A PISTON in feet per minute, when the length of stroke and the number of revolutions per minute are known: Multiply twice the length of stroke, in inches, by the number of revolutions per minute, and divide by 12. Example: An engine has a stroke of three inches, and makes 300 revolutions per minute. What is the piston speed? Twice the length of stroke is six inches. Multiplying by 300, and dividing by 12, we obtain 150 as the piston speed in feet per minute.

GOOD HEALTH.

Salicylic Lemonade.

As a "hospital beverage," says the *British and Colonial Druggist*, which has lately been found of great value in typhoid and other fevers, scurvy and gout, the following cannot be too widely known, it having been, we understand, first devised by a late medical officer attached to the Soudan expedition: Take 10 lemons; ½ ounce citric acid; 200 grains salicylic acid (salicylate of soda is undoubtedly meant), with white sugar and water to the taste. Squeeze the lemons, and put the juice aside; boil the fruit in half or three-quarters of a gallon of water for fifteen or twenty minutes; after standing for six hours take out the lemons, and again press them before throwing the exhausted pieces away. Add the juice and citric acid to the liquid, boil five minutes and strain. While hot add the salicylic acid, and stir until dissolved. Sweeten to taste with white sugar, and make up the bulk to one gallon with water.

Salicylic lemonade may be taken freely, either of the strength here given, or diluted with half its bulk of water. It should be freshly made every two or three days, unless it be permissible to "qualify" it by the addition of a little pure French brandy. If required to be in a "bright" condition, add, when cold, a little beaten up with white of egg. Boil for three minutes, and filter. If found too harsh for some tastes, dissolve in the boiling liquid, before straining, half an ounce of Nelson's patent opaque gelatine, previously swelled for five hours in cold water.

CAUSE OF STAMMERING.—Referring to stammering and its treatment, Mr. Edgar S. Werner, editor of the *Voice*, writes: A person may stammer with a full lung as well as with an empty one, and for the former to increase the quantity of air already inhaled would augment the difficulty. After many years of personal experience and the observation of scores of stammerers, I confidently assert that the quantity of air, be it large or small, in the lungs has little or nothing to do primarily with this affection. Using familiar terms, my theory is that stammering is an abnormal action of the laryngeal valves. The latest physiological authority shows that the larynx—the voice box—has two valves, namely, the one formed by the true vocal chords and the one formed by the false vocal chords, the closure of the former preventing the ingress of air, and the closure of the latter preventing the egress of air. Now, stammering is a conflict between or an antagonism of these two valves—all of the contortions, shortness of breath and various

other manifestations resulting therefrom. The only rational and effectual treatment of this speech defect, therefore, is to establish a harmonious action between these two valvular processes, together with correct diaphragmatic activity, whereby the proper tension of air takes place in the lungs, and the column of air reaching to and playing upon the vocal chords is rightly supported, and the supralaryngeal parts left free to mold, modulate, and articulate the voice which has been produced at the vocal chords.

Electrical Surgery.

A young man, 22 years of age, living at Burlington, Vermont, recently fell and injured his thigh. He suffered excruciating pain and soon lost the use of his leg. He went to New York for treatment by Dr. A. M. Roberts, who performed a remarkable operation which is described as follows:

The young man was put under the influence of ether, and Dr. Roberts, with a scalpel, laid bare a portion of the hip bone about three inches wide. Then he called into play a bone cutting machine, invented by himself and called the electro-osteotome. It is worked by an electric battery and can revolve surgical instruments 12,000 revolutions, if necessary, in a minute.

The doctor attached a small drill to the instrument and cut out portions of the hip bone up to its head, a distance of four inches. These pieces of bone under the microscope showed disease. The doctor then used still larger drills until there was a space large enough to admit the entrance of a man's finger. He now wanted to see the exact condition of affairs inside of the bone. To do so he used a novelty for this class of work—a tiny incandescent electric light, about as big as a pea. This Dr. Roberts introduced inside of the passage in the bone, and the several flashes of light enabled him to see just where the diseased bone was. Then he took up his drill again, and cut out the diseased bone wherever it was necessary as easily as if the bone were open before him on an operating table. Dr. Roberts put in a drainage tube to take off the diseased matter that might form, sewed up the wound, and applied antiseptic bandages. A hypodermic injection of morphine was given to the patient, and when he recovered from the effect of the ether he was in a satisfactory condition, and it is conjectured that he will in a comparatively short time be able to use his disabled limb.

Something to Live For.

It has been asserted by scientific surgeons that the will-power of a sick man has a great deal to do with his dying, and the case of Charles O'Connor is cited as evidence. A still stronger case occurred in Michigan the past summer. An old man living in the northern part of the State, got out a lot of timber many years ago for a toll-road company, but the company failed and left him in the lurch. For years and years he tried to sell the timber to this one or that, but no one wanted it, and at last time and decay rendered the heame almost worthless. Last summer the supervisors of that county advertised for proposals to build a bridge, and the old man put in a bid. While waiting to see what would be done he was taken very sick, and he grew worse so rapidly that a council of doctors was called. After due deliberation he was informed that he was approaching his end.

"When will I know about that bridge?" he coolly asked.

"The bids will be opened to-day."

"Well, I'll send John over to see who gets the job, and my living or dying will depend on his news."

At 5 o'clock in the afternoon the son and the family physician arrived in company. The old man was neither better nor worse.

"Well?" he asked, as John approached.

"Our bid was accepted, father."

"And we've got the job?"

"Yes; but the doctor says you can't live."

"I can't, eh? I'm not only going to live to build that bridge, but I'm going to work that square timber into it up to the last foot, or my name isn't John Rodgers!"

It is a fact, vouched for by a dozen good men that he was off that dying bed in a week, and in less than a fortnight was at work on the bridge.—*Devoit Free Press*.

COCOAINE AS A LOCAL ANÆSTHETIC IN FRACTURE.—Dr. J. R. Conway, Jr., reports in the *Medical Record* a case of fracture of the lower end of the radius reduced without pain after injection of cocaine. He says: "All attempts at examination of the fracture caused great agony, and I resolved to try if deep injections of cocaine at the point of fracture would sufficiently anesthetize the parts to allow of thorough examination and reduction of the deformity without causing pain. I proceeded to inject five minims of the four-per-cent solution into the inner, outer and posterior surfaces of the forearm, directly over the seat of fracture and as deep as the bone. In five minutes the fracture could be thoroughly examined and even roughly handled without the patient experiencing the slightest pain. After the examination I reduced the deformity by extreme extension of the wrist joint, together with traction, using considerable force, but without causing the patient any uncomfortable sensations."

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Butte.

LOVELOCK ITEMS.—Oroville Register, Apr. 7: The Black Channel filled with water and this necessitated putting in heavier machinery to pump it dry. The company have put in the needed machinery and they are now driving ahead at a good rate and working three shifts of men. The Pershaker mine is filling up as there has been an accident to one of the steam pumps. The Aurora is taking out fine pay dirt; the new hoisting machinery at this mine works splendidly and I consider it one of the best mines in the county. Prospecting is brisk about Magalia and everybody is looking for a mine, and new locations are being made daily. Some good strikes are being reported. A man named Brown who has been at work some time made a strike the other day, and it is thought that he has found an old channel. Wiley Bros., Collins and Dean are running a new bed-rock tunnel. So is the Golden Drift Co. and they will soon reach pay. Detroit Nooner & Co. are busy prospecting their ground, and you will soon hear of a big strike from them.

DEEP CHANNEL MINING.—Oroville Register, Apr. 10: There can be little doubt on the part of those who are most familiar with the subject that deep channel mining is destined to become of great importance in Butte, and the mines will exceed in richness any that were discovered along the Feather and its various tributaries in the pioneer days of the State. Along the Magalia ridge the deep channel mining is fast attracting attention and in a short time these mines will be found in other parts of the county. The vast flow of lava from Lassen, Butte and other volcanic peaks in Plumas county covered the old river channels in this county and turned the rivers aside from where they had been flowing for years. These old channels were far higher in gold than the newer ones and where a channel is struck beneath the lava it is almost certain to contain more or less gold. On the Mooretown ridge and on the Mountain House ridge these mines are bound to be found in a few years and then the mountains of this county will be more prosperous than in the days of '49 and '50.

Calaveras.

A PROMISING MINE.—Calaveras Chronicle, Apr. 10: The Riverside mine, in Hundred Ounce Gulch on the Amador side of the Mokelumne river, just north of this place, will make a big paying mine if it holds out as it promises. Messrs. Nuner and Lowry, the owners are confident of having struck upon the source of the rich placer ground in the gulch below, which was famous for its richness and the coarseness of the gold found in it, one nugget which was found weighing over one hundred ounces from which the gulch took the name of One Hundred Ounce Gulch. The character of the gold found in the ravine below led to the belief that a rich quartz lead must exist somewhere in the immediate neighborhood, but it was never found, there being no croppings to indicate its location. There is about two or three feet of soil to be removed before the lead is exposed, and in some places it is necessary to dig a foot or more below the surface of the ledge before any signs of quartz are found. Messrs. Nuner and Lowry have prospected the lead for a distance of four or five hundred feet finding rich quartz all along. Some of the specimens of rock are exceedingly rich, showing quite large pieces of gold clinging to the quartz. A piece of rock weighing about a pound was ascertained to contain in the neighborhood of \$20 of gold. Mr. Nuner states that he had been prospecting, off and on, for the past four years in that vicinity with the hope of finding a quartz lead there, but without success, until recently when Mr. Lowry, a prospector of long experience, joined Mr. Nuner in the search in which they were finally successful in discovering a hidden treasure.

Mariposa.

THE DILTZ MINE.—Gazette, April 10: The late rains have been exceedingly favorable for surface washing at this mine. The heavy embankments are fast yielding to the force of water, thereby exposing a vast amount of quartz, in layers from 3 to 20 inches in thickness. The late wash has exposed that part of the vein on the summit where Tom Early, a prior owner, took out 232 ounces of free gold, besides 250 tons of decomposed quartz which was ground at the Whitlock mill and paid \$32 a ton. The surface mining this winter has been subjected to two heavy land slides, which occasioned a great amount of dead work, but had necessarily to be worked off as it covered better ground. The best part of this mine is yet to be reached by means of a tunnel running from north to south on the line of the vein, on what is known as the spring level, and stopping up. This will have to be done with the building of a mill and other improvements, whenever the property falls into the hands of capitalists able to carry it on.

SAXON CREEK STRIKE.—Stanislaus News, Apr. 5: M. M. Rumley, of Mariposa county, for ten months past has been working a claim on Saxon creek, with but very little success, until last Saturday. Just six feet below the surface he struck it rich, and in a little time took out \$6,000. Later he took out \$3,000 more. Considerable excitement prevails in Mariposa over Mr. Rumley's lucky strike.

Nevada.

BAOGER MINE.—Grass Valley Union, April 8: The frame of the new hoisting works building for the Badger mine is up and nearly covered in. New sets of timbers have been put in the top of the shaft, and the work of setting up the pumping and hoisting gear will be commenced in a day or two more. The pipe for conveying water to the works is on the ground, and the ditch and tunnel through which the water is to be conveyed will be completed within ten days. Messrs. May & Walker, the contractors for putting up the works, think that in two weeks more they will about complete their job.

BOSTON MINE.—Grass Valley Union, April 13: The Boston mine, formerly known as the Granite Hill, on the east side of Wolf creek, and below Boston ravine, is showing up finely. The company now working it is composed of working miners, who took a bond upon the property last season, since which

time a substantial hoisting and pumping rig has been put up and the old shaft sunk down to a depth of 230 feet, where a level has been opened, which has been yielding excellent milling ore for some months. Recently the work of sinking for a new level was commenced, and it is now down 30 feet, and in six weeks more will reach the depth of 100 feet, when a new level will be opened. The ledge in the shaft shows a vein of solid quartz on the hanging wall, which averages eight inches in width, and between that and the foot wall are stringers, which promise to make into the main vein at a lower depth, and form a strong ledge. The ledge in the shaft and the stringers are rich in gold and fine sulphurets, and every carload of rock that is sent to the surface contains ore that is liberally sprinkled with gold, and the quartz itself is of that kindly character that miners regard as reliable in yielding good pay. As the ledge looks now in the shaft the new level is going to open up a splendid body of ore—better than that found in the 230 level, although all the rock now taken from that level is of high grade. The mine is worked by water power, having free water from Wolf creek, sufficient for any purpose, and the machinery used will work to the depth of 500 feet.

RICH.—North San Juan Times, April 10: The quartz vein struck at Buckeye Hill is something to boast of. Its owners are prospecting it thoroughly. Rock pounded in a mortar proves it to be rich. A. N. Crane, of this place, is one of the principal owners.

NORTH BLOOMFIELD.—There are no idle men in Bloomfield because of the running of the Derbec and the De Noon mine. The town looks neat and clean but is not growing very rapidly. The Derbec drift mine gives employment to about 100 men, 85 or 90 of whom work in the drift. We visited that mine Thursday last and witnessed a cleanup. We are forbidden to say anything of or concerning the same but a few bricks of the kind manufactured by Mr. Galovotti, the superintendent, would soon make a Croesus or a Vanderbilt of the owner. The Derbec mine is run very economically and is ably managed.

THE SUTRO TUNNEL.—Virginia Enterprise, Apr. 13: This famous concern is now in the hands of a receiver, the mortgage upon it, held by McCalmont Brothers & Co., London, amounting, together with interest, to \$1,500,000, having been foreclosed. The receipts of the tunnel from royalty on ore extracted from the Comstock amounts to over \$300,000 per year, which certainly is pretty good interest on the indebtedness. It is to be hoped that whoever may finally own and control the tunnel will have money, brains and ambitious judgment enough to push the tunnel further into the heart of old Mount Davidson and tap some of those numerous rich veins of gold and silver ore known to exist to the westward.

GOOD QUARTZ PROSPECT.—Transcript, April 7: There has of late been considerable excitement in the vicinity of Sweetland about a quartz ledge uncovered long ago by hydraulic mining operations at Buckeye Hill. A. N. Crane, the jeweler at North San Juan, and W. D. Campbell have made a location and are now sinking a shaft with most encouraging results. Charles Barton and many others have located extensions, the ledge being traceable for a distance of two or three miles, and new claims are being staked off daily. Deputy Assessor Brophy, who is our informant, is of the opinion that some good mines are likely to be found on the ledge.

MINING PROPERTY SOLD.—Transcript, April 3: The company known as the London and California Mines Limited, and of which Mr. Johns is the Pacific Coast agent, has sold the Erie quartz claim, near Graniteville, to George Mainhart, of Grass Valley, and the Pennsylvania claim, which is situated just at the northwestern edge of this city, to J. D. Thomas. The latter property contains about 96 acres.

Placer.

RELOCATION.—Placer Republican, April 7: The owners of the Big Oak Tree mine near Colfax, report that the mine continues to pay and is improving as it is developed. One day last week, however, they found on their hoisting works a notice of relocation posted by B. E. Valentine, the gentleman who owns, or represents the owners of the Rising Sun, the adjoining mine. It is claimed by Mr. Valentine that the ledge of the Big Oak Tree dips under the surface lines of the Rising Sun, and that therefore he is entitled to the gold. The Werry Bros. have retained counsel and will contest the claim.

MORNING STAR MINE.—Foothill Tidings, April 10: A lot of gravel specimens taken from the Morning Star mine, at Iowa Hill, Placer county. The gravel is a cement and is filled with coarse and heavy gold. The cement is what the miners call "lousy with gold." This gravel is 18 feet thick from the bed rock up, and the channel is about 100 feet wide. A tunnel, or breast has been run in on this gravel for 50 feet and it is all rich for this distance. The tunnel in to strike the gravel is 19,000 feet long, and it was too low and a raise of 60 feet had to be made. The gravel tunnelers generally get in too high. Getting in under the gravel is better than getting in above it.

Plumas.

QUINCY NOTES.—Greenville Bulletin, April 10: "Mrs. Grundy" informs us that the now celebrated Valentine ledge in Mohawk is likely to be sold to San Francisco capitalists. An expert has examined the property and on his return to the city telegraphed to two of the owners, who at once went down and have not yet returned. The Buckeye mine at Sawpit Flat is doing all that is claimed for it. It is reported to show from \$15 to \$25 a car right along.

San Luis Obispo.

CHROME MINING.—Tribune, April 9: William Albert and two other miners have for the past month been working in the Osos mine, seeking and taking out chrome ore. This mine is southwest of and in sight of this city, in the range of hills lying between Los Osos valley and the ocean. The mine is opened by a short tunnel, which started in on fair croppings, but these soon gave out and the miners continued into the hill. In about 100 feet they struck a ledge of very rich, black ore, about six feet in thickness and extending above and below the tunnel, containing an unknown quantity of ore. The miners work on a contract with R. E. Jack, agent of the Philadelphia Chemical Company, and receive \$2.50 for each ton they take out. Within the period they have been at work, about 30 days, they have taken out 100 tons, and are yet in bonanza. The

ore is hauled to Miles station, on the Pacific Coast railway, where it is worth \$8 per ton.

Shasta.

MACHINERY FOR THE MINES.—Anderson Enterprise, April 7: Last Wednesday two carloads of machinery for Sunny Hill and Bullychoop mining districts arrived in Anderson. The machinery destined for Sunny Hill is a complete five-stamp mill, for the Sharp Mining Company, owners of the Spencer mine. The machinery destined for Bullychoop mining district, is a ten ton Hill Triumph ore mill, with four Triumph concentrators. This mill is being taken up by H. B. Williamson, and the machinery for both mills is from San Francisco. The Hill mill will be constructed as a custom mill, to be erected on the Potts & Foster Eureka mill site, at the terminus of the Bullychoop toll road, and will be constructed and run for some time by Mr. Williamson.

SUNNY HILL.—A letter received from Sunny Hill informs us that times up there are quite lively. Mr. Loomis is crowding work ahead on the Spencer lead, and is taking out lots of rich rock. "Big Charley" has sold his mine to Enright for \$12,000. Tim Quinn is meeting with good success in his mine lately purchased of Davis & Smith. Considerable prospecting is being done, and the general affairs of the district are very encouraging. Next month C. K. Parson's stage line will be extended to Sunny Hill, and also to Bullychoop.

IRON MOUNTAIN.—Shasta Co. Democrat, April 8: About half the force at Iron Mountain has been discharged. All but five stamps of the mill shut down and Superintendent Ellsworth deposed. All this has come to pass because the company discovered, after working nearly 800 tons of ore, that the ore was not being treated right. It seems that the process adopted by Ellsworth is a failure, as many mining men predicted. The temporary failure is not the fault of the mine. The ore is there in quantities but the proper plant was not put up to save the mineral. The company are now experimenting to find out if possible what machinery is required and what process is best adapted for successfully handling the ore. There is too much money already invested, and too much good ore in sight in the Lost Confidence to let the enterprise go to the ground now. But the strangest thing of all is that the company did not know how to treat the ore in the first place. Tom Green's five-stamp mill arrived last week. Low-grade lead carbonate ores are found on Cow Creek. Several stockholders in the Iron Mountain mine came up on the train last evening. We are informed that a new superintendent is in charge of the Iron Mountain mine. The Croesus Mining Company blew their steam whistle for the first time last Monday. Ed. Burke, of the Portuguese Flat hydraulic mine, was in town Monday, but we didn't have a chance to interview him. The Brown Bear Mining Company of Deadwood have ordered five more stamps which the company will add to their mill, making 15 stamps in all. Mr. C. C. Jones, who superintended the Winthrop mine at Copper City last fall, wrote to L. E. Bainey a few days ago to the effect that he had bonded the Billy Hill, Popejoy and Jennie June mines in Copper City district, and will associate some Eastern capitalists who will try to work those mines by concentrating the ore, and from the concentration extract the metal. Mr. Jones has recently worked a ton of this ore in San Francisco in this way and feels confident the same process will be successful on a large scale. Mr. Jones' letter is very encouraging and predicts ultimate success for Copper City.

Sierra.

STRIKE IN THE SAN LUIS.—Tribune, April 9: The San Luis Consolidated Company has tapped the ledge in the tunnel at a depth of 200 feet from the surface and cut through it to the foot-wall. The ledge is between four and five feet wide, and prospects well—much better than the owners expected it would at this point. This mine is situated at the head of Avalanche ravine, about three miles southwest of Sierra city, and is considered a valuable property. There is every facility for working the mine. The ledge can be tapped nearly 700 feet from the surface by running a tunnel about 400 feet. The company will run east on the course of the vein and it is expected to open up a large body of good milling ore. The owners have still another ledge on their location which is supposed to be very rich, and which was worked some twenty years ago by Mexicans. A tunnel will at once be run to tap this ledge 200 feet below the old workings.

Siskiyou.

NOT WATER ENOUGH.—Yreka Union, Apr. 10: The big ditch is not well supplied with water as reported which is one of the causes of the suspension of work in several of the mines on Yreka flats. Louis Scheld, who has been using forty inches from the ditch is cleaning up in his mine, as he cannot work to advantage with a lesser quantity, and the lessees of the ditch were anxious to reduce the supply.

Tuolumne.

MINE SOLD.—Union Democrat, April 10: The Jumper mine, situated on the mother lode below Quartz Mountain, located and operated successfully for some time by the Fitzgerald brothers is about to be sold to Mr. Fisher, who bonded the mine some time ago. Mr. Fisher is satisfied with the mine and the price asked, \$9000, and the sale will be consummated upon the arrival of the money, which was looked for yesterday.

NUGGET.—Johnny Gaynor, nephew of Peter Kelley, was driving the cow Monday on Stockton street, when near the creek his sharp eyes saw something yellow. He picked it up and found it to be a pure gold nugget that weighed 32. It has a familiar look to those who saw what the miners took out in that locality in early days.

Trinity.

NEW MILL COMING.—Trinity Journal, April 10: From Mr. Gupta, of Indian creek, we learn that a contract has been let for the building of a wagon road from the end of the Cottonwood road to the Pound Cake mill-site on Bullychoop, to enable the latter company to get in a new mill. Much work will be done at Bullychoop this summer and we anticipate good reports from this district.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, April 10: On the 2900 the main north lateral drift has been con-

ducted with more directly from the station, and carried forward by a turn to the west in order to avoid the west seam previously encountered, and it is being run to intersect the good body of ore found in that direction some months ago. Explorations from the upraise winze between the 3000 and 2900 are discontinued at present, but stopping in the fine ore deposit found in upraising above the 3100 level are still going ahead, the ore from the explorations being carefully stored away in the drifts and crosscuts until hoisting can be done to advantage through the Combination shaft. Drifting laterally from the bottom station of the deep winze, at the 3200 level, will be commenced shortly. Superintendents Patton, Osbiston and Lyman, who have recently inspected this fine ore development above the 3100 level, speak very highly of it as the best prospect yet found at that depth.

GOULD AND CURRY.—On the 600 level the main south lateral drift gained 45 feet during the week, its face being turned east of south in new ground. The material is principally quartz of a low-grade ore character. The crosscut west on this level gained 32 feet, and is running in vein porphyry. Rule's anticipated bonanza is supposed to be not far away.

POTOSI.—The main lateral drift south, or rather east of south on the 3100 level has made over 11 feet per day during the past week, the ground being of a very favorable nature. It is dry but easy working, and the face of the drift has nearly reached the middle of the Potosi ground, which is 700 feet in lateral length.

CON. CALIFORNIA AND VIRGINIA.—During the week the daily yield has been a little less than 400 tons averaging about 516 per ton, from battery samples. The explorations southwest on the 1400 level and those to the west on the 1650 level are progressing energetically and well.

MEXICAN.—The west crosscut on the 500 level is in 123 feet, showing no features of interest to report. On the 700 level the joint Mexican and Union drift running northwest from the Ophir shaft is 609 feet in length, 33 feet having been added during the week.

CHOLLAR.—Nothing doing in this mine beyond the promoting of the transportation of waste through it from the main lateral drift south in Potosi ground. No order as yet received to crosscut the ore vein or to resume sinking the Combination shaft.

BEST AND BELCHER.—The water has been lowered in the shaft during the week 29 feet. The pumps are doing good effective work, but owing to the great extent of country to be drained, the receding of the water in the shaft is comparatively slow.

SIERRA NEVADA.—The crosscut west on the 520 level was advanced 29 feet during the week, making a total length of 326 feet. Material, dry porphyry and quartzite, exceedingly hard and working unfavorably.

OPHIR.—The explorations on the 300 and 400 levels show no improvement over last week. Good work is being done, but thus far streaks and bunches of low grade ore only have been met with.

YELLOW JACKET.—About 130 tons per day continues to be the average from the old workings above the 1300 level. The old ore stopes hold out well, but the ore generally is of rather low grade.

CROWN POINT AND BELCHER.—Daily yield about 375 tons. A considerable portion of this comes from the 1600 and 1700 levels, and is better grade than that from the old upper workings.

MONTE CRISTO.—No ore is being extracted from the old mine at present, work being confined to running the drifts west on the 50 and 150 levels from the new shaft.

UNION CONSOLIDATED.—On the 500 level north lateral drift No. 2 is in 355 feet, 36 feet having been added during the week. Material, vein porphyry, dry and hard.

ALTA.—On the 700 level the main lateral drift north has reached the Benton line, and next in order will be to crosscut west through the ore vein.

KENTUCK.—Daily yield about 50 tons from the old upper workings, keeping the Rock Point mill supplied.

Columbus District.

HOLMES.—Candelaria True Flissure, Apr. 10: In the 8th level we are stoping in the Morris ledge. This stop is still 170 feet long and is large and strong. This stop looks just the same as it has for a long time. The ore body that is parallel to the last mentioned ore body looks well. It runs in a northwest course from main 8th for a short distance and then turns west. It may possibly come into the main 8th stop when we get far enough west. In the western end of the main 8th we have connected with a winze that was sunk by the General Thomas Company when they were working this ground. The gypsum ore body is still producing and we are getting some good ore from here. A portion of the ore that comes from this point is sulphurets ore and high grade. In the drift from raise in eastern end of 9th level we now have a good body of ore. We have drifted 50 feet in this ore body. It started from raise in a northwest course. It has turned to a west course and now runs almost due west. We started the drift off on this ore body at a level with the old 8th level. The face of 8th level is 200 feet west of top of raise from 9th. We have started work in the east face of 8th, and will run it in and connect it with this ore body. We have started a raise in the 9th level about 100 feet west of 9th raise on a streak of high grade ore that we think will connect with the ore body in the drift at the top of 9th raise. The ore that comes from the drift is a good one. It is nice yellow chloride ore and will average \$100 per ton.

MOUNT DIABLO.—On the 6th level the east drift is in 421 feet and the north crosscut from the west drift 225 feet. The stop between the 5th and 6th levels is giving some \$60 ore. The intermediate drift between the 4th and 5th levels shows eight inches of \$70 ore. We are getting some ore of fair grade above the west drift on the 4th level. The stop above the east drift on the 3d level is giving a little ore of fair grade. The east drift on the 2d level is yielding some ore of good grade. We are taking high grade ore from small streaks above the west drift on this level.

Eureka District.

ORE SHIPMENTS.—Eureka Sentinel, April 10: The following shipments of ores have been made (Continued on page 265.)

The Selby Smelting and Lead Company.

Ore Buying, Ore Reducing and Bullion Refining.

A representative of the PRESS paid a visit a few days since to the new works of the Selby Smelting and Lead Company, near Vallejo Junction, on the line of the transcontinental railroads. The new plant of this company is very extensive and much more complete in its appointments than the old one which they have had for many years at North Beach in this city. The business of this company was first established as far back as 1865, for the working of base metal ores and bullion and the manufacture of their products.

The New Works.

The volume of business gradually increased so as to outgrow the facilities of the works at North Beach, and it was determined to seek a new location. A point on the bay shore was selected near Vallejo Junction, Contra Costa county, and the land and water frontage secured. Gangs of men were set at work filling in the water lots and leveling the ground for the establishment. There are 43 acres in the whole plot, and the three franchises give them 3450 feet of water frontage. The works themselves cover an area of about six acres, and there is abundance of dumping room for waste, so that the available area is constantly being extended. At the front of the works is deep water, and wharves have been built so that ships of any size can be docked, and their cargoes of coal, etc., deposited in the yards close to the smelters. At the rear of the works is the overland railroad track, and side tracks and switches have been put in, so that ores, etc., may be readily handled. The company owns its own steamer, which plies between the works and San Francisco, bringing up supplies and taking the products to market, when not to be shipped by rail.

When the plant was moved to its new location, the old engines, furnaces, etc., from the old works were brought up, but a great many new things have been added, making the plant the most extensive on the Pacific Coast.

The Different Departments.

In the engine room, which is quite commodious, and has a solid asphalt floor, is the main engine for running the machinery of the works; Burleigh air compressors for supplying air to run the various small engines throughout the works, including the Chamberlin cartridge machinery; the hydraulic accumulator by which the various elevators are operated; Baker blowers for the blast furnaces; the dynamo for furnishing electricity for the electric lights by which the works are lighted at night, etc. The hoiler capacity is 300 horse-power. There are six boilers, two of them being spare ones. A fine Llewellyn heater is also provided.

Back of the engine room is the ore sampling room, where there are rock breakers, crushers and pulverizing machinery necessary to carry on the work in this department.

The blast furnace division is at the extreme western end of the works; a long brick line connects the furnaces with the large stack, which is 100 feet high. Ample room is provided for the erection of additional furnaces as required.

In the next large division of the works are the numerous reverberatory furnaces for smelting ore or the by-products. Next to this is the roasting room, where the sulphurets ores are roasted and the ore freed from sulphur, arsenic, etc.

A large space in the works is devoted to the manufacture of blue-stone, which is one of the products they have been making for some 12 years past. They now make and sell from 800 to 1000 tons a year. With the exception of the Dayton works, this is the only place on the coast where blue-stone is made. Some cement copper is purchased for use in this department, though at present they have enough copper from their own products for all purposes, a copper matte being formed from the ores.

In the silver room are the appliances for refining gold and silver, including large and well-arranged vats for precipitating silver by means of copper. The sulphuric acid process is here used in the separation of gold and silver; the latter is precipitated with copper and the resulting copper is afterwards utilized in the manufacture of blue-stone. As hereafter stated, the company purchase gold and silver bars, and also receive Dore bars and refine them.

The lead bullion department is an interesting portion of the works. The bullion is received from the Eureka mines, Iroy, Benson and all other places where lead smelting is carried on. The Selby works receive this bullion and refine it. The cupel furnaces, retort furnaces, and all the usual appliances for refining base bullion are well and conveniently arranged. The refined bars with the stamp of the works, are piled up in the spacious yard, ready for shipment.

A Well Arranged Plant.

The arrangement of the whole works has been made in the light of extended experience, the various departments being placed in the relation to each other which provides for the greatest convenience, and causes the least handling of material. Steel railroad tracks extend in every direction throughout the works, and turn-tables are placed at all corners, so that the iron hand cars are readily moved to and from all points. In fact there are two stories of these tracks. The buildings are quite high and there is a double system of tracks, one above the other, the cars being raised to the upper system by hydraulic elevators placed at suitable points. By these means a great deal of labor and time is saved. There are about 170 men employed, the works running day and night (excepting Sundays), with two shifts of men.

On one of the hills back of the works is a large reservoir for supplying fresh water. Near by are several cottages—the beginning of a village—where the workmen live. The boarding houses for the men are across the track from the works and are neatly kept, commodious and clean.

One of the most attractive portions of these immense works is the assaying department, consisting of four well-lighted, large and airy rooms. There are the reducing and muffles furnaces, sand baths, etc., and all the usual appliances. One room is set aside for weighing where there are several of the finest assay balances. There is a great deal of work done in this department, several assayers being employed. The various lots of ore, bullion, etc., are here tested, and the facilities are very complete.

In all the main departments or rooms the floors are of solid asphalt so that they can be kept clean and dry. The buildings are high-shedded, so there is plenty of light and air, and arrangements are made for preventing the accumulation of dust or debris of any kind.

Throughout the works are many evidences of the practical knowledge and experience of the accomplished superintendent, Mr. Prentiss Selby, under whose personal supervision the new plant has been arranged. Many of the devices are of original design, especially in the assaying, refining and furnace departments. A noticeable improvement is the "water-jacket door" used in the reverberatory and roasting furnace. To the inner portion of the metal plate forming the door is secured a receptacle through which a stream of cold water is constantly flowing, so that no matter how great a heat there may be, the door can be readily handled. The pipes and hose connecting with this can be arranged as to take the weight of the door, so that it can easily be moved aside or replaced with no difficulty either from weight or heat.

An important adjunct to the new works is that of the manufacture of

Breech-Loading Shotgun Ammunition.

At the extreme north end of the plot of ground a fine two-story building has been erected especially devoted to the making of breech-loading shotgun ammunition. This is done by machinery, the Chamberlin automatic cartridge loader being used. There are seven of these machines, making the capacity about 100,000 cartridges per day. The machines are run by a compressed air engine. In the same building are the packing and storage departments. Shotgun shells of the same interior capacity, when loaded by hand, are found to vary in their finished lengths, which is, of course, evidence that the wads are not level, or that the quantity of powder or shot varies, so that constant pressure is not used in ramming the charges. Unequal results must necessarily follow, much to the annoyance of shooters. The measurement of powder and shot in the usual way varies more or less. Shaking by hand does not always level the charge to even the wads squarely on the surface. It is impossible to always put the wad down perfectly in

the shell by hand. Many trust to the rammer to level it as it goes down, which the rammer fails to do, and a weak-shooting cartridge is the result. Then, the degree of pressure upon the wads varies, it being found impossible to secure uniformity of hand pressure in this respect. Careful examination of a hand-loaded cartridge will reveal its defects.

The Chamberlin Cartridge Machine.

The Selby Company have purchased the right for this coast to use the Chamberlin machine, and since commencing the manufacture of these cartridges have built up an extended and growing trade. The defects of hand-loaded cartridges are all remedied by the Chamberlin machine, which insures the sportsman perfect accuracy in the load, and will also save him much time and trouble. The machine-made cartridges are placed on the market under the brand of "Standard Chamberlin." Of course, all sizes are made, and for any kind of shooting. Each cartridge is perfect, since the machine automatically assort and tests each shell.

This machine is one of the marvels pertaining to the development of the science of modern gunnery. It is so constructed as to perform all the operations of loading shells with absolute accuracy, giving uniform charges of powder and shot and uniform pressure upon the wads, and with any desired number of wads. Each wad is inserted in the shell separately, with such pressure upon it as may be wished, and forced home in an absolutely level position, an advantage that cannot be secured in the hand-loaded article. The rammers are graduated and adjustable to any desired pressure up to 100 pounds, so as to obtain the highest explosive force without crushing the powder.

The empty shells are placed in a guide, and as the machine is revolved, they drop one after another into a small receptacle formed to catch them, and each shell becomes part of the mechanism for the time being. As the shell drops into the little pocket, with the open end up, the powder from the glass receptacle, shown in front and on top of the machine, drops into the charge shown below it, and the fixed charger into the cartridge from said charger. This charge of powder is accurately measured and is subject to gradation. It goes into the shell, to which a jar or shock is imparted, so as to level the powder smooth on top.

As the machine revolves, the powder-loaded cartridge next comes under a plunger which forces down a pasteboard wad upon it. The wad is tapped or tamped by a slight blow. The next plunger forces down a pink-edge wad upon the pasteboard; which is followed in turn at the next plunger by another pasteboard wad. Then the cartridge comes under a spout from which the charge of shot comes, and, as it goes round, another pasteboard wad comes on top of that. All these wads are sent uniformly and evenly, and there is an even pressure on each, something that cannot be accomplished by hand. When the last wad is in, the cartridge is reamed smoothly, a stamp marks the number in the end, and the completed cartridge drops into the box ready for packing. Mr. Selby has materially improved the means for feeding the wads, and has also improved the reaming or crimping attachment, so that the edge is smooth and never broken or ragged. Standard varieties of these cartridges are made to be kept as stock, and special lots are loaded to suit individual requirements when ordered. The uniformity in loading is of the highest importance, and only the very best material is used. The desire of the company is to make their loaded shells that their standard character will be recognized by shooters, who will always be able to get the same quality at all times.

In addition to the works at Vallejo Junction, the company have a shot-tower in this city, where all sizes of shot are made for the Pacific Coast market. At the same place they also manufacture sheet lead, lead pipe, etc.

At the office in this city, 416 Montgomery street, there is a department for the purchase of gold and silver bullion.

Purchasing and Working Ores and Sulphurets.

From what we have said, it will be seen that at these works every facility has been provided for working gold, silver and lead ores. The company is prepared to purchase and pay the value of the gold, silver and lead in the ore, based on the New York prices for the silver and lead, and the actual value of the gold.

From these values is deducted the amount of ordinary losses in working and the regular charge for the beneficiation. These ores are paid for usually after they are sampled and assayed, and the check or money forwarded or paid to any individual or bank the owners may designate. In every case, after the sampling and assaying, the ore is kept until the parties who own it are heard from to know that the sampling and assaying are satisfactory. In this way all parties are protected, and if any one has overrated the value of the ore and is dissatisfied the sale need not be made.

With the increased facilities of the new plant, the company is now prepared to purchase ore in large or small lots. Miners will do well to bear this in mind, for these facilities have not always been available. The company is an old-established one of most excellent reputation, and prospectors and miners may feel sure of fair and honest treatment in every way.

There are many mines on this coast, the ore of which carries more or less sulphurets. In years past the sulphurets were allowed to run to waste, but where there is any considerable percentage, they are now concentrated and saved. Of course if mines have their own chlorination works the sulphurets may be worked at home; but chlorination works are not numerous. The Selby company have all the necessary appliances for working sulphurets, and are able to do it to a good, high percentage of assay value. Moreover they return the silver as well as the gold contents—something not done by the chlorination works. Miners need no longer pile up their sulphurets, but can ship them and have them worked at moderate charge by this company.

Gold and Silver Bullion Refining.

In 1879 this company extended its operations and purchased the refining and assaying business established by Kellogg, Heuston & Co., in 1851; continued by the San Francisco Assaying and Refining Works, and afterwards by the Pacific Refining and Bullion Exchange.

The gold and silver department of the works is a very important one. Gold and silver may be deposited for refining and the charges for this will be the same as in the Mint. The returns for gold bullion will be made within 24 hours; on the silver bullion in from 10 to 14 days. The payments of silver can be made in fine bars and in a shape to be sold in the open market.

This is the only private refinery on the Pacific Coast where miners and dealers in gold bullion throughout the country can make their shipments by Wells, Fargo & Co., and receive their returns within 24 hours after being received by the Selby Co. After being received the proceeds are payable in gold coin, or by check, as shippers may direct.

This being a private institution, they are enabled to afford every accommodation to depositors in the way of making returns. For the protection of the depositor assay samples of every deposit are kept for six months, so that at any time parties who are dissatisfied from any course may have re-assays made in order to satisfy themselves entirely.

The arrangements of the new works are such that the facilities can gradually be extended as demanded. Since the removal it has been found that the business has already materially enlarged. The company is desirous of increasing its ore-buying department, and to this end every facility will be given to miners owning lots of ore which they may want worked.

The main office of the company is at 416 Montgomery St., San Francisco, where all correspondence should be addressed. The officers of the company are: A. J. Ralston, president; H. B. Underhill, Jr., secretary; and Prentiss Selby, superintendent.

MANGANESE.—Consul Guerson at Coquimbo, Chili, sends to the State Department a remarkable report in regard to the mining and shipment of manganese from that country. He says the ore lies in ridges on the mountains near that port, and thus far has been mined simply with crowbars. There seems to be no end to the amount that can be obtained. The only expense attending it is hauling it to the port. The first cargo ever sent away from the country was in September last. Since then about 6,000 tons have been shipped.

THE Big Bend Tunnel is completed. The dams are not yet constructed and it will be sometime before the river is turned through.

Mineral and Metalliferous Veins.

The New Hypothesis Verue the Old.—No. 3.

EDITORS PRESS:—Presuming that our philosophizing on this subject may be of interest—to some of your readers—we venture a little farther on the new trail. Supposing our views to be correct or nearly so, it may be found that as “like attracts like” so quartz would attract quartz and ore attract ore. So also would silicon unite with some constituents of ore in equivalent proportions, providing it had not already united with other elements for which it had as great, or greater affinity. Hence we might

Divide Veins Into Three Classes.

First, true ore veins; second, true quartz veins, and third, mongrel ore veins. The first consisting chiefly of ores, the second purely of quartz, and the third being an intermediate class.

Supposing nature has formed a true quartz vein in the crust of the young and growing world, and subsequently a shower of chaotic matter containing metals is precipitated approximate to it; they may exist in such a chemical state or compound as to possess no affinity for the existing quartz vein, therefore their own innates forces draw them together to form veins of their own peculiar character, uniting only with as much silicon as they have an affinity for. Then at a still later period, other showers of matter continue to fall, and are washed to and fro across the veins, each vein would attract elements or compounds of its own character, until some metals fell which were free to unite with elements in the quartz vein, and found a resting place in what was formerly a true quartz vein; but now becomes a mongrel ore vein. The quantity of ore thus deposited, though small at first, might continue to increase, but could never surpass the richness of a true ore vein.

Decompositions of silicon compounds would also deposit

Silica in Ore Veins.

To illustrate such decompositions and recompositions, suppose a wave of fluid matter containing chloride of silicon (under heavy atmospheric pressure), flowing over a silver vein, would not the chlorine find a stronger affinity for the silver, and unite with it to form chloride of silver (horn silver), while the silicon set free would rapidly unite with the oxygen to form quartz? In this manner innumerable changes may have taken place, the result of which would be the deposition of silica or other gangue in a vein. But hasty nature ceases not here, and the ores eliminated from the gangue by such actions, moves steadily on towards the strongest centers which seem to have grown under this influence, until their increased dimensions sometimes burst the very rocks, as a growing plant does the soil.

Reasoning From This Standpoint.

The more quartz is found in a true ore vein, the richer and larger will be the pay streaks; but it must be borne in mind the elements of ores are vastly different and unite with silicon in a variety of quantities, so also are their powers variable to eliminate silicon from other compounds, that it might be free to form silica with oxygen and at once become a fixture in the vein. Hence, one character of ore would carry a large accompaniment of quartz, while a different kind carries very little. Thus, the character of ore may determine the proportional quantity of quartz in a vein and the quantity of quartz or gangue with ore of a certain character would also determine the quantity of ore.

Still Another Influence

Should be considered; if “like attracts like” it is more than likely that after changes had taken place, resulting in a deposit of barren quartz, it too would continue to build up with matter of its own class, its extent being determined by the character of the country rock in which it existed.

Why approximate veins do not dip at the same angle may be due to the tendency of some mineral compounds to become solidified more rapidly than others, and thus resist the force of waves of matter which would tend to wash the precipitating vein stuffs onward in their course.

My very superficial knowledge of chemistry does not justify me in asserting that chlorine has a greater affinity for silver than for silicon, nor have I access to any work that will enlighten me on the subject, but the illustration drawn above serves to convey the idea how silicon can be eliminated from certain compounds by certain elements existing in veins, hence a recomposition with oxygen, as stated.

Since writing the above article I have received the PRESS of March 6th, containing Mr. Blackburn's second letter on this subject, and must say his criticisms call to mind the words of the poet:

“The man is thought a knave or fool,
Or bigot plotting crime,
Who, for the advancement of his race,
Is wiser than his time.”

Mr. Blackburn evidently considers himself a progressive man, and yet those who view matters in a different light from his own, have not “an atom of reason in their composition.” Now if Mr. Blackburn is a scientific truth should remember that the most pro-

found topics that ever engaged the human mind have found “intellectual giants” on both sides. And though I do not consider myself a philosopher or intellectual giant, yet I would be sorry to admit that I do not possess “an atom of reason in my composition.”

While this gentleman holds our “little tints,” our “new discovery,” up, in derision, and makes the broad assertion, without proving it, that, “there is no analogy, and there is no use to discuss the subject as stated,” yet he finds analogy between the “formation of rock candy and that of crystallized quartz.” Yes, even more, he illustrates his theory by “a drop of ocean water in the field of a microscope” and “it is all under and according to the same law.”

What profound philosophy! that such should be the case, and that the same law that governs chemical action on a metal plate should have no effect on a large scale in nature.

Now Mr. Editor your readers are well aware that science has frequent recourse to

Artificial Means of Illustrating

Nature's works and though our “little tin type plate” was an accidental discovery, we consider it none the less a beautiful illustration of the formation of metalliferous veins.

Although Mr. Blackburn has found that the metals are deposited in a small quantity by hot water solutions, it does not necessarily follow that all our very large bodies of rich ores were thus formed. In our first letter on this subject we admitted a statement of Vonnegott's that “No one theory will apply to all mineral deposits” and though “hastard” veins may be formed by percolating waters, we still cling to the opinion that the richer deposits were formed in the manner we have described.

By examining our “little tintype plate” under a glass you will observe that the clear black portions which show no silver to the naked eye, are covered with minute particles of it; probably every atom of this would find its way to the veins unless counteracting forces prevent its doing so.

Thus in nature there must often exist atoms of the metals dispersed through the rocks; all of which are moving steadily on to the greatest centers of attraction. A St. Louis correspondent of the Chicago Mining Review, clothes this idea in the following beautiful language:

“Galvanic forces reached afar,
These threads they run from star to star,
This sympathy of Mother Earth,
Has been with her from time of birth.”

In the PRESS of January 9th, page 27, in the “Good Health” column, is a short article entitled “A New Method of Introducing Medicine into the System,” which is done by means of electricity, and which supports our theory very definitely, and transforms Mr. Blackburn's reference to the mines in Arizona into a very strong argument in our favor. Water being a powerful conductor of electricity, the atoms of metals were borne along on the constantly flowing magnetic currents in the direction of the heaviest deposits, but coming in contact with the timbers which were non-conductors of electricity their passage was impeded and they found a resting place in the surface of the wood and were not deposited by evaporation. We have heard old miners say the aniferous sands of the Ssacchawan can be worked over year after year with the same results. They believe the gold is being continually washed down from the sources of the stream and the tailings are thus replenished. We believe on the above principle that the atoms are being united into dust heavy enough to be saved in the sluicelox.

All Veins are not Faults

In the formation as we can prove to Mr. Blackburn by the Luella mine in Soap gulch, Silverbow county, M. T., as it not only shows no displacement of the rocks, but at a depth of about 65 feet the vein is definitely cut off by a strata of micaceous rock about two feet thick, which no theory can explain, but that which we have advanced. When the vein was being formed a shower of matter fell which contained no metals, consequently the vein was “capped” over, but when subsequent showers fell containing metals they were attracted by the force below and continued the building up of the vein. The Colonel Robert G. Ingersoll mine that we are prospecting at present shows a fault very definitely, the hanging wall being elevated two feet above its primitive position, but we do not consider it adverse to our theory as it is reasonable to suppose an earthquake would break the ground in the direction of the least resistance and a fault would only prove that a vein extended down to great depth.

Before closing this article it may be well to state that “the known compounds of silicon are not numerous,” those mentioned in Silman's Chemistry are with oxygen, chlorine, bromine, fluorine, and sulphur.

The first, silicic acid (silica) is a solid with which prospectors are acquainted in the form of “rock crystals, agate, common uncrystallized quartz, siliceous sand, etc.” The second and third, chloride of silicon, and bromide of silicon are liquids denser than water. The fourth, fluoride of silicon is a dense, colorless gas. The fifth, sulphuretted silicon is a white, earthy compound. It is decomposed by water into silica and sulphuretted hydrogen.

On these compounds we base our theory how silica becomes associated with the ores, as set forth in the first part of this article.

We close with the wish that whether we be right or wrong, “truth may prevail.”
Glendale, M. T. HENRY W. BROWN.

About Obtaining Patents.

Patents are Virtually Contracts

Between inventors and the public. The consideration flowing from both parties to the contract is expressly fixed by statute. The Government requires the following consideration in every case: First, that an applicant for a patent shall disclose a new and useful improvement, of which he is the first and original inventor. Second, that the invention has not been patented, or published in a printed publication prior to the date of his invention. Third, that the invention has not been in public use, or on sale, more than two years prior to his application for a patent. Fourth, that the invention shall be properly described and claimed in the specification forming a part of the patent. Provided an inventor complies strictly with these conditions, the Government guarantees that the inventor shall have the exclusive right to make, use and sell the thing invented for the term of seventeen years.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. This question can often be answered gratuitously by us, immediately on receiving full information of the invention, by reason of our long and extensive practice as patent solicitors and editors and publishers of first-class, scientific and industrial journals, during the past 20 years and over. When the question of priority of invention is not so readily to be determined, it is generally best to make what is termed a “preliminary examination,” by searching through the patent office reports among the patents in the class to which the invention relates, and referring to our extensive patent library, containing compilations of special classes of American and foreign inventions, mechanical dictionaries, scientific encyclopedias, files of scientific and mechanical newspapers, and an immense number of patent applications by inventors of the Pacific coast, carefully filed by this office since 1860.

If, by this “preliminary examination,” the improvement is found to have been previously invented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely whereby his invention has been anticipated, thereby saving him further expense and perhaps much time, useless delay, anxiety, etc.

To avoid all unnecessary delay, however, in securing patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately, and forwarded to the inventor for his signature. When the inventor receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps to be taken.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretence of doing cheap work, in order to antiseptic custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give case up as long as there is a chance to obtain a patent. The Agency charge is from \$25 to \$30, or sometimes more, if the invention is intricate or complicated, or requires much labor. Drawings cost from \$5 upward, according to their number and the time employed, and, if a model is sent, the express charges upon this and the papers must be added. The total cost, in addition to Government fees, rarely exceeds \$40, and for this we do all we can without appealing the case.

When the invention consists of a new article of manufacture, or a new composition, samples of the separate ingredients sufficient to make the experiment, and also of the manufactured article itself, must be furnished.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are considered more satisfactory to the Patent Office than the old and more cumbersome system of storing up an immense bulk of almost numberless models.

Drawings or sketches, sufficient to illustrate clearly the invention, with a sufficient description to enable us to make a full set of perfect drawings for the Patent Office is all that we require. A model will answer our purpose as well however, in cases where the inventor can more easily furnish it for our use.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or very poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention while in reality it may be of great value, and would meet with ready sale had the invention been fully portrayed by artistic and skillfully executed drawings. Again, when patents of this character are brought into court, the uncertainty and ambiguity of the drawings enable the opposing experts to mystify the judges as to the construction or combination of parts intended to be covered by the patentee. In all cases prepared by us, the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken that the invention is fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

In the Patent Office

The application is assigned to the Examiner having charge of the class to which the invention relates. The case must then take its turn with others in the order of filing, and in due time is carefully examined to test the novelty of the in-

vention. If the examiner fails to find anything that anticipates the invention, a patent is immediately allowed, provided the specification and claims are drafted in proper form. Should the Examiner find a prior patent which, in his opinion, anticipates one or more of the claims in the application, a letter of rejection is sent to the attorney in charge of the case; and, if the attorney coincides with the views of the Examiner, the claims rejected are erased. In preparing applications for patents, an attorney should be careful to familiarize himself with the class of inventions to which the application pertains, so that the specification and claims may be drafted as nearly perfect in the first instance as is possible. This course saves much time in prosecuting the application to a patent.

When claims are improperly rejected on patents which do not anticipate the spirit or wording of the claims, proper steps are immediately taken to convince the Examiner of his error. This is done, in most part, by personal arguments, as the differences in construction, operation, function and results are more readily discovered and appreciated by an oral presentation of the facts than can possibly be done by relying solely on written arguments. In order that the Patent Office record of the patents shall be complete, an oral argument is generally supplemented by a manuscript brief, that others, in examining the files at any future time may clearly comprehend the position taken by the Examiner and attorney in prosecuting the case to patent.

In addition to our own personal attention to the interest of our clients here, we have, for over 12 years past, had constantly in association with us in Washington, one of the foremost legal counselors and ablest of practitioners in patent business in this country, who carefully attends in person to our business at the Patent Office, and has attained success in a most marked degree.

Perfect Claims.

The value and force of a patent are dependent on its claims. A patent may disclose to the public the most important and valuable invention, and yet the claim be of such meager scope that the patent is actually worthless. When the claims of a patent are so loosely drafted that infringers can flood the market with improvements, differing from the improvement disclosed by the patent only in slight changes in construction and arrangements of parts, such a patent is valueless to the owner, as it fails to afford him that exclusive and complete protection guaranteed by the Patent Law. Hence it is that the greatest care, skill and perseverance are required, first, in properly drafting the claims in the first instance, and second, in prosecuting the application before the Patent Office, and maintaining the rights of the inventor to claims as broad and sweeping as the invention will warrant. This latter is no easy task. The Examiners of the Patent Office serve in the capacity of attorneys guarding the interests of the public. It is their sworn duty to exercise the greatest care and watchfulness, that patentees do not secure claims of greater scope than they are justly entitled to. It is but natural that Examiners are sometimes in error as to just what scope should be accorded an invention. Although the Examiners act under honest convictions in cases where they refuse an inventor his just rights, yet it is the duty of the attorney to maintain the claims of his client, if he is convinced that they are just and proper. To succeed in this requires the display of tact, firmness and ability; and when the Examiner is made to see that the inventor is honestly and fairly entitled to the claims which have been rejected, he will almost invariably recede from his former action, and allow the case.

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The firm of DEWEY & Co. (continuously editors and publishers of the MINING AND SCIENTIFIC PRESS, nearly from its early commencement in 1860) offer comparatively far better facilities to the local inventors of the Pacific States and Territories than are possessed by any other agents in America. Members of the firm give personal attention to the applications entrusted to their care. They have been longer in practice in patent soliciting than most agents who are still personally engaged in the business. They have secured more U. S. and foreign patents in the past 20 years (with very few exceptions) than any other firm still existing. Their practice has been so successful and long continued, that the great majority of inventions on this side of the American continent have been patented through their agency, thus affording them great and valuable experience, by thorough information of the true principles and points of novelty in the inventions, whether general in character or peculiarly local to this coast.

The extensive business combination and experience of this firm is undoubtedly one of the most fortunate in existence for affording inventors prompt and reliable advice, and the best possible facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation that is best calculated to widely inform the class of readers most specially interested in the subject of his invention.

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Inventors on this coast will find that owing to our familiarity with inventions and local affairs of this coast, we can more readily and fully comprehend their wants, and thus save much of the time ordinarily consumed in preliminary writing back and forth when distant agencies are employed.

CAVEATS.

A Caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the caveator to receive notice, for a period of one year, of any application for a patent subsequently filed, and which is adjudged to be novel, and is likely to interfere with the invention described in the caveat, and the caveator is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from \$10 to \$20. The Government fee is \$10 additional.

To enable us to prepare caveat papers, we only require a sketch and description of the invention.

Rejected Applications.

Inventors who have rejected cases (prepared either by themselves, or for them by other agents), who desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

Inventors who do business with us will be notified of the state of their application in the Patent Office, when it is possible for us to do so.

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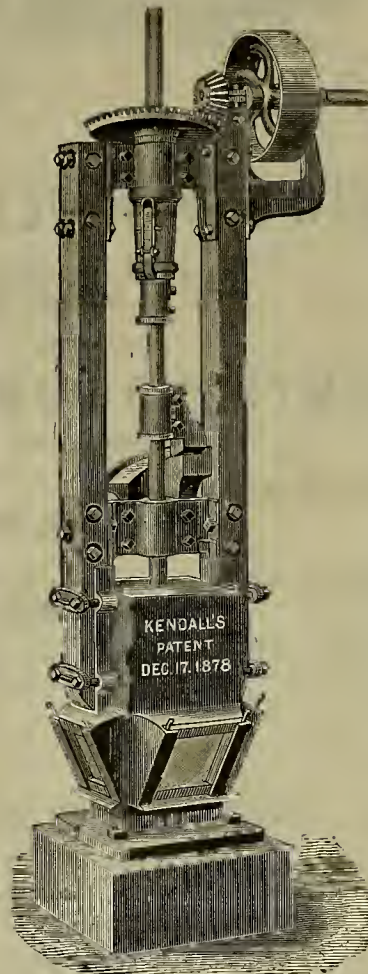
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Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroehnke's process, etc. Under "Pulverizing Machines" are described the astra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

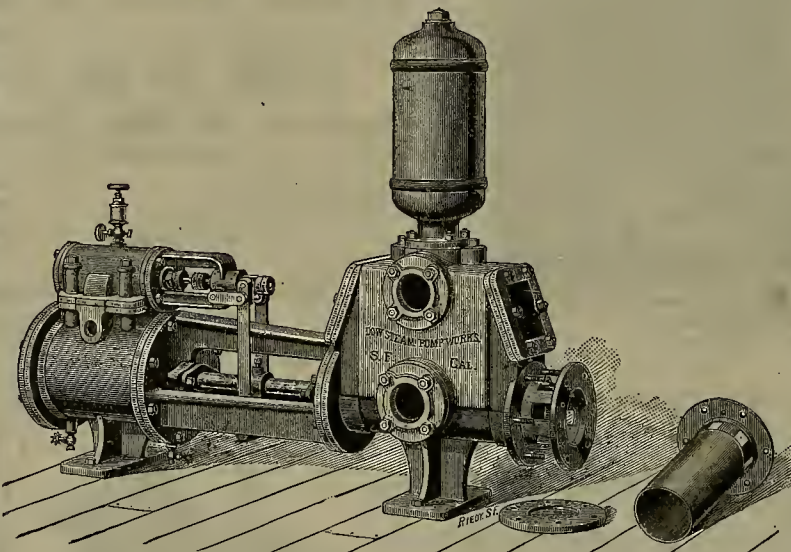
In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be made of Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

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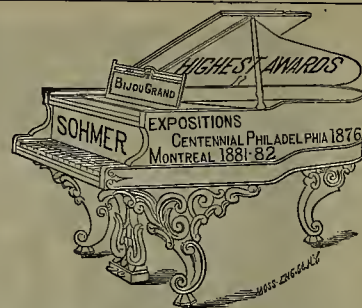
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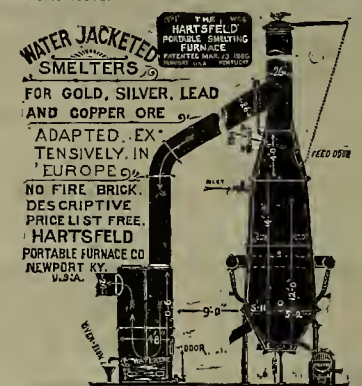
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Mining Summary.

(Continued from page 260.)

during the past week from properties of Eureka district to the Richmond Reduction Works: Jackson mine, 13 tons; Lone Pine, 7; Alexandria, 16; Mohawk, 12; Rosalind, 4; Oriental and Belmont, 7; Benson, 1½; and Continental, 3½.

Frieberg District.

ORE.—Belmont *Courier*, April 10: Harry B. Campbell informs us that there are large quantities of ore in Frieberg district that will assay from sixty to seventy dollars per ton in silver. Whenever a railroad runs near enough to these mines to lessen the cost of supplies a boom may be expected in Frieberg.

Hawthorne District.

LAPANTA BULLION.—Walker *Lake Bulletin*, April 7: The last cleanup of Lapanta bullion at Moss mill was about \$15,000. These bullion shipments will make pleasant reading to the English company that failed to complete the purchase of the Lapanta and the Garfield silver mines, the yield from the Lapanta will rapidly make up the entire price that was to be paid.

THE NORTH STAR.—Virginia *Enterprise*, Apr. 13: Tom Daly's mine, the North Star, situated two or three miles to the southward from the Lapanta, in Hawthorne district, promises to develop into a good paying property. Assays from it, made in this city the last day or two, show the average of the ore to be \$20 per ton. It is free-milling gold ore, easily mined, and plenty of it. Twenty-five tons of it can easily be extracted in a day, and, with a small mill near the mine, a big fortune could easily be made. The greatest drawback on the prosperity of these mines is water. This can be brought in iron pipes a distance of nine miles, and this eventually will be done if the mines hold out and continue their present promising and prosperous showing.

GOOD FOR PROSPECTORS.—This is a good country for prospectors. Some of the districts are dry and consequently expensive; but others are well watered and men who do not stay in camps all the time are liable at any time to find a ledge from which money can be taken almost immediately. Quartz carrying free gold is the poor man's rock, and as there are now opportunities for working any kind of ore, and almost a certainty of more reduction works being put up, this is one of the best places in the State for poor men who are not too poor to purchase supplies for a month in the mountains.

Lone Mountain District.

BASE ORE.—Belmont *Courier*, April 10: Uncle Billy Koch will shortly resume work on his Lone Mountain mines. The ore is base, carrying a high percentage in lead. Extensive operations will be carried on at these mines as soon as supplies can be got there at reasonable rates.

Ophir District.

LOOKING WELL.—Belmont *Courier*, April 10: Pat Leonard informs us that the Grizzly and Cinnamon mines of Ophir, of which he is a part owner, are looking well and give every promise of developing into permanent mines. The ore contained in them assays well in gold. It is expected that a company of capitalists will take hold of them shortly, and open them in a manner that will soon make them self sustaining. The mines of Ophir are going to make a big record, and they will do so on merit.

Pioche District.

RUMORS.—Pioche *Record*, April 7: There are rumors abroad to the effect that the mines in Pioche have been sold to an English company and things will soon boom. If the mines here have been sold there is nothing of record to show it. There are negotiations going on and a change cannot take place too soon to suit the people of this county.

San Antonio District.

WORKING.—Belmont *Courier*, April 10: Hon. John Gooding, Superintendent A. B. Eastwood and George Nicholl intend working some of their claims in San Antonio district this Summer. It is claimed by persons well acquainted with this district that good mines exist there, and all that is needed is sufficient capital to open them in a systematic manner to place them on a paying basis.

Sierra District.

DEER GLEN.—Cor. *Silver State*, Apr. 7: A few items from this old camp may interest some of your readers. The mining industry is about as usual, save some excitement about placers, in which Barbour's canyon takes the lead so far. There are some forty or fifty Chinese in the canyon, and the number is daily increasing, which is strong evidence that there is gold there in paying quantity, for Chinamen at least. The ground is all claimed by white men, who sell mining claims to Chinese, at prices ranging from 25 to 75 cents a foot. There is also a small party of Chinese prospecting in Auburn canyon, on the east side of the range, and they are thinking of buying, so I am informed. The Lang Syne mine and mill are running steadily, under the efficient management of John Ross. Some thirty men are employed at the mill and mine. The Auburn is being worked under lease by V. M. Nelson and partners, who are extracting a little ore, but not doing as well as they hoped to do. S. M. Hendra and Stephen Thomas have discovered a gold-bearing ledge, near the old Monroe mine, which bids fair to eclipse anything hitherto discovered in the district. The ledge is about four feet wide, and free gold, visible to the naked eye, is abundant in the quartz.

Washington District.

NO WORK.—Belmont *Courier*, April 10: No work is at present being done in the mines of Washington District.

ARIZONA.

HASSAYAMPA.—Prescott *Courier*, April 10: Messrs. Nels, Gable and Fred Saites, just from the Blue Dick mine, Hassayampa district, report great piles of rich ore. "Boston" and his partners are preparing to sluice out large pot holes on the upper Hassayampa. They cut lumber a mile from their claims and packed it down hill by man power. "Boston" expects to wash out \$50,000 this spring. A note from Hon. A. W. Callen (Old Grizzly), assures us that the Oro Fino hydraulic mines, just below Walnut Grove, on the Hassayampa, are yielding a great deal of gold. The Tuscumbia mine, Turkey creek district, continues to yield silver ore worth thousands

of dollars per ton. Messrs. Jackson & Curtin are taking ore out of the Del Pasco and War Eagle mine, in Pine Grove district. They have leased the Basin mill and will start it up just as soon as sufficient ore shall have been extracted. Placer miners along Lynx creek and Big Bug are making fair wages. Owners of the Gray Eagle mine, Bradshaw district, have refused several offers for the mine, which is both large and rich. They say the ledge runs from seven to nine feet in width and samples away up in gold and silver.

COLORADO.

LEADVILLE MINES.—Herald-Democrat, Apr. 7: The output of the A. Y. and Minnie mines has been very large during the past month. The Chrysolite Silver Mining Company during January yielded only \$17,000 worth of ore. Things look very quiet in the vicinity of the Adelaide and Argentine mines, on the north slope of Iron Hill. A good pocket of ore was recently opened by lessees in the G. M. Favorite, situated on the south slope of Printer Boy Hill. Work on the Litter shaft on the Printer Boy Hill continues. The shaft is going down rapidly, and should soon encounter the contact. Drifting from the bottom of the Leo shaft to the southwest is making fair progress, and the ground begins to look more encouraging. The cupelling furnace at the American smelter is doing good work and is being operated steadily. It produces six to seven tons of litharge a day. Despite the almost impassable roads the Antioch mine, on Breese Hill, continues shipping regularly, and there are ten stamps dropping at the Antioch mill. Judge Curley, who has a lease on the southern portion of the Garden City lode, is driving a drift to explore the lateral, or east and west fault, which is supposed to run up the gulch, and to contain some good ore. Mr. Stotesbury still declares that he will close down the Wolfstone mine as soon as the present contract for 1,500 tons is filled, unless the smelters pay him a better price for his ore than they have so far offered. A considerable amount of exploration work will probably be commenced on the property of the Little Pitsburg Mining Company about the first of May. The property shows large bodies of iron ore in the northern portion of the hill, which, it is thought, contain some fair pockets of argentiferous lead ore. The incline from the foot of the McHarg shaft has been advanced a distance of nearly 200 feet, running through the limestone under the ore. Yesterday the raise started from the incline, 140 feet east of the shaft broke into a fine body of mineral, and the company will soon be in a condition to make large and valuable shipments of ore from their portion of its mine.

IDAHO.

LAVA DISTRICT.—Wood River *Times*, April 7: E. C. Headrick, the notary public and conveyancer, who came in from Lava district about a month ago, advises all strangers to keep away for two or three weeks longer, when they can go, as a rush is expected. Frank Martin, who sold the Horn Silver for \$55,000, has bonded the Golden Chariot, near Martin, for \$75,000, and has a Salt Lake company about organized to take up the bond. Mr. Dillinger has bonded an adjoining claim—the Idaho—for \$6000. The Elkhorn is down 75 feet, with a 4½ foot vein of milling ore averaging \$60 to \$70 per ton. The Hub, Palace, Valley, Sunshine, Arab and other Lava Creek mines are looking finely and show horn silver from end to end. The district will produce considerable ore this summer, and will probably have a population of at least 500 souls.

THE BULLION MINE.—Wood River *Times*, April 7: Colonel Wall called at the *Times* office to-day. He said the development in the lower level of the Bullion mine did not warrant any excitement in the community, but as he did not wish to be accused of suppressing any facts of public interest he willingly stated the following: They have five men at work in the Bullion, but may add two or three men to the force soon. During the past three weeks they have been getting more or less ore, and now have a vein of galena from six to twelve inches thick and go to 35 feet high.

SMOKEY DISTRICT.—George Richardson got in last night from Smoky, where he had been all winter, engaged in development work on a claim in which he is interested. He says that there is a great deal of ore in sight in a number of claims there, and that the shipments, as soon as the season opens, will average at least two car-loads per day. About 30 men are working there now, but in the next 60 or 90 days there will probably be all of 200 men employed. Mr. Richardson had to come in by way of Black's, some 25 miles out of the way, owing to the fact that the road to Croy's gulch is not broken.

THE PARKER.—Ketchum *Keystone*, Apr. 7: The Parker mine, which has been comparatively dormant during the past winter, was the scene of an important strike on Wednesday, the 31st ult. Working in an upraise above No. 2 level, about 125 feet east of incline, a five foot ledge was struck carrying 25 inches of an ore streak and 12 inches of solid galena which is fully up to the standard value of the first-class galena ore. Prof. Jenney, from whom we learn the above, states that the ore body is very promising, and can be definitely determined in a few days.

THE SILVER STAR.—A fine body of gray copper ore—about twenty inches in width—was struck in the Silver Star mine, of the Philadelphia Mining and Smelting Co., on the 27th ult., in the face of the west drift, about 300 feet under the surface. The ore is exceedingly high grade and will assay in the thousands. This is a very important discovery to Ketchum, as the ore from that locality will be reduced almost exclusively at this point. The Smoky road will now undoubtedly be pushed to completion with all possible speed and is destined to be a busy highway during the coming season. The P. M. & S. Co. has several other properties looking well in that locality, among which is the Salamander, and the O. C. King of the West, Carrie Leonard and Isabella are all looking very well at the present time and will probably contribute largely to our local smelters.

MONTANA.

BUTTE.—*Miner*, April 10: The recent "caves" that have occurred in some of the mines of this camp have had the effect of opening the eyes of our mine owners to the importance of securing good, practical

mining men to manage their properties. There is no doubt that there are in this, as well as many other camps in America, good mines gone or going to wreck and ruin on account of injudicious management. This is especially applicable to the underground workings of the mines. The same rule that prevents a banker from hiring a raw, uncouth, illiterate country bumpkin to fill the important position of cashier, should also prevent a mine owner, or those having the control of mines, from having men who have nothing to commend but a knowledge of the market value of ores, the proper keeping of books or the price of a thousand feet of lumber. And yet we constantly see and hear of cases where book-made miners are put in control of mining properties, and properties that have considerable merit.

THE PARROT.—This mine is, without doubt, one of the best managed properties in the world. Its efficient superintendent, Benjamin Tibbey, is a miner of the old school. It is just as safe for a person to go down and wander through the levels of this mine, as it is for him to walk through the hoisting works of the property. Everything is conducted in a safe, careful and judicious manner. The mine never looked better than it does to-day. The stopes on the 200 and 300-foot levels are producing the usual quantity of ore with no apparent difference in the supply. The 400-foot level is opening out in a very satisfactory manner; the two ledges, north and south, are looking well and bid fair to excel anything in richness and extent before seen in the mine. The pretty, compact smelter is working to its full capacity.

THE ANACONDA.—A gentleman connected with this grand property was yesterday asked how the mine looked. He said: "That is a question that is impossible to answer. It is immense, it is wonderful, it is grand." He further said: "You know what the famous Eureka Consolidated mine was? Well, the Anaconda is a far better mine than the Eureka Con. ever was." As the Eureka Con. mine paid over \$4,000,000 in dividends in four years, it is an easy matter for our readers to estimate the value of the Anaconda. The ledge in the 700 and 800-foot levels in extent is almost measureless, while its value is increasing constantly. The property is managed by one of the most careful mining men in the world, Mr. Marcus Daly, while the underground workings of the mine receive the personal supervision of that grand old-fashioned miner, Mike Carroll.

THE PACIFIC.—This mine is attracting considerable attention from mining men, and it deserves all the praise that is being bestowed upon it. The principal work being done is conducted on the 75-foot level, from which point an immense quantity of ore is daily extracted. The ledge at this point is very large, and arrangements are being made to sink the main shaft to the 100-foot level.

THE MINNIE IRVINE.—The sinking of the main shaft from the 150 to the 225-foot level is going bravely on. The stopes on the upper level are yielding handsomely.

NEW MEXICO.

SOUTHERN CAMPS.—Socorro *Bullion*, Apr. 7: The Black Range districts are all improving, but the greatest interest just at this moment is centered in the Kingston mines. The present revival of mining interests manifested in the East will cause many mines in the range and its foot-hills to be actively worked this season. The Palomas Chief is developing splendidly, and is dumping a better class of ore than heretofore. The Antelope and Eagle mines are shipping mineral to the Billing smelter. The Lady Franklin of Kingston, owned by Thompson and Chapman, is turning out on an average about \$80,000 worth of mineral a month. A stamp mill will be erected in the Telegraph district this season. The mill at Lake Valley is running successfully. Prof. Langsdorf is there, but expects soon to return to Socorro. Kingston, Lake Valley and Lordsburg will all make heavy outputs this year.

SOCORRO NOTES.—Bullion, April 7: The Eaton concentrator in the South camp of the Magdalenas has started up and is working smoothly and successfully. Hon. Chas. Blanchard and Rev. F. Lestra took in the Billing works this week. Mr. Blanchard who is president of the L. V. & St. L. M. & S. Co., expects soon to ship mineral to this plant. H. A. Robinson shipped two carloads of ore from the Imperial mine this week to the Billing works. His lease on this property has expired, and G. W. Cook, one of its owners, will at once commence important development work in its lower workings. The Billing works, during the past month, has operated two of its three stacks. The roaster has not been idle. A large quantity of matte is now in course of desulphurization near the works. The plant as usual worked throughout the month without interruption, and it continues to be a practical demonstration of the value of our surrounding mining districts. The Brittenstein M. & M. Co.'s concentrator, in the Pueblo district of this county, lately treated a quantity of mineral from the Gutierrez mine and made from its 200-ounce concentrates. This speaks well for the mine and mill when we consider that the ore thus treated had been sorted over five times, and from it all the richest ore had been shipped to other points for treatment. H. C. O'Rear, superintendent of the Brittenstein M. & M. Co.'s plant and mines, was in Socorro Monday. He and H. F. Brittenstein, who was also in the city, informed our reporter that their mines never looked better, and that the mill and concentrator were in successful operation. They shipped steady consignments of bullion to the East, and will ship their concentrates to the Graphic smelter of this city. The work of enlarging the Graphic smelter continues without intermission. Lieut. Duph has completed the railroad switch to the plant, and quite a number of carpenters and other mechanics are engaged in erecting the additional buildings, and preparing the grounds for the reception of the castings and machinery which will arrive next week to be used in erecting the 80-ton stack.

OREGON.

THE GRANITE CREEK MINES.—Oregonian, Apr. 7: An experienced miner from Colorado, who left there a short time since for the Granite Creek mines, is in the city, on his way to the Colville country. He went as far as Victoria, and from what he learned there concluded not to try Granite creek. He says the paying ground found there was very limited, being in the gorge of the creek, which is only fifteen

to twenty feet in width and only three or four feet to bed-rock. The part of the creek in which the gold was found was very rich, and from the time the diggings were discovered, in August, till the season ended, on November 18th, there was taken out \$96,000. He concluded that from the limited nature of the diggings they must be about exhausted, and that by midsummer they will be thoroughly cleaned out. The north fork of the Similkameen was prospected up for a long distance, but no pay dirt was found. There are rumors of some quartz ledges having been found in that section, but there is nothing certain about it. Under this view of the case he concluded to try the Colville country. He has seen the sensational reports from the Yukon, but has no notion of going there. He has no faith in the reported richness of the diggings, and no notion of traveling 300 miles into the interior of so wild and inhospitable a country on the chance of finding even rich diggings, where the season is only about three months long.

STRIKE.—Albion, Apr. 7: What promises to be one of the richest and most extensive strikes that has ever been made in Jackson county was made by John Robinson and John Slagle on the hills in the front of Grinnell's ranch, some two miles distant in the hills. The find is rich decomposed rose quartz, bearing free gold in abundance. The ledge has been traced on the surface for a distance of over 700 feet, and at a depth of six feet is five feet wide. In every piece of quartz can be found a prospect of free gold. We visited the ledge Wednesday, and found Messrs. Robinson and Slagle at work taking and sacking the quartz, the ledge laying in such a position that one man can take out several tons in a day. Several parties are interested in extensions on the same ledge, which has been traced for some distance. On the location notices we notice the names of D. Miller, Wm. Robinson, F. Barneburg and J. B. Griffin. The above parties being also interested in the first strike.

UTAH.

REVIEW.—Salt Lake *Tribune*, Apr. 9: The week has not been productive of any mining sensations. The weather has been what is not unexpected at this season, alternate shine and storm, with the roads all but impassable. The receipts in this city for the week ending April 7th, inclusive, were \$77,868.87 in bullion and \$21,579 in ore, a total of \$99,447.87. For the previous week the receipts were \$146,159.20, of which \$82,745.20 was bullion and \$63,414.00 was ore. The output of the Ontario for the week was 17,859.37 ounces of fine bullion, and ore to the value of \$1408.31. For the month of March the Ontario product was 101,819.61 ounces of fine bullion, and \$40,270.48 in ore. For three months of this year its output was as follows: Bullion, January, 11,702.37 fine oz.; February, 118,088.19 fine oz.; March, 101,819.61 fine oz.; total, 221,702.17 fine oz. Ore sales, Jan., \$50,872.33; February, 61,054.19; March, 40,270.48; total, \$162,207. A total yield for three months, reckoning silver at \$1.02, of \$500,541. The Daly product for the week was 8839.94 ounces, in fine bars. For the three months of this year it has been as follows: January (ore sales), \$28,455.20; February, \$31,662.06; March, \$24,948.38; March (bullion at \$1.02) \$41,662.11; total, \$126,727.75. Indications point to a yield from the Daly of about fifty per cent as compared with the Ontario. The base bullion output of the week was \$16,795; fine bars, \$19,491 ounces as reported. The Hanauer smelter produced during the week \$20,663 in bullion; the Park city smelter \$1,500. The Germania has not yet begun its product after the clean-up and repairs. The Stormont sent up \$6,157 in silver during the week. The Union National Bank received on the 3d, sixteen bars of Alice bullion, \$13,262.87. Ore receipts were \$2,129; silver and lead ores, \$15,450; Queen of the Hills, \$4,000.

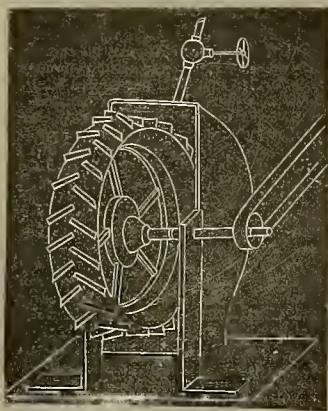
A NEW SANDSTONE FIND.—Pioche *Record*, Mar. 7: Great excitement has prevailed for several days over a new strike in the hills southeast of Silver Reef. The find is near Virgin city, twelve miles distant. Ed. Cripps made the first discovery and samples he brought to the Reef assayed from \$84 to \$119 in silver per ton. The formation is sandstone and the ore of the character of that in the Reef mines. The Frisco *Times* reports quite a stampede of prospectors there.

THE ONTARIO.—Park *Record*, April 10: Everything is progressing finely at the Ontario mine. The usual force of men is doing good work, and the extraction of ores goes on with such grand results and with such regularity that it is getting to be an old story. On account of the bad roads only small shipments are made to the mill, but the mill has stowed away its 2,300 tons of ore to fall back on. At the mill the output of bullion for the week has not been up to the usual standard. Following upon the long and successful run of the Ontario mill comes the announcement that the regular force will be laid off for about three weeks in order to make the annual clean-up and repairs. The mill will close down in about a month and it is whispered that twenty stamps more will be added. There is nothing new to report from the Woodside, Sampson or Morgan, but something of a surprising nature is expected to develop soon in the operations of these and some other mines in the near future.

THE CRESCENT.—Stuart Stephenson, superintendent of the Crescent mine and concentrator, went up to the mine yesterday to pay off the men, some forty in number. The concentrator has been thoroughly overhauled and it is understood that it will begin reducing the ores the first week in May. As soon as this is done the force at the mine will be increased by nearly fifty miners and the tramway will be brought into use again in supplying the concentrator with from 150 to 200 tons of ore per day.

THE BURLINGTON series of mines, in the Independent district, are looking fine. The west end of the Burlington mine, worked by Messrs. Job, Edwards, Maddern & Co., never looked half as well as it does at present. On the 130-foot level of this mine a rich ledge was recently discovered that will result in returning great profits to the worthy lessees and in much good to the camp.

THE ALICE.—Superintendent W. E. Hall reports everything in and around the "Old Reliable" as being in first-class condition. The main shaft is going down towards the 1,000-foot level as rapidly as possible. The 800, 700 and other levels above are looking well and producing in the usual liberal manner.



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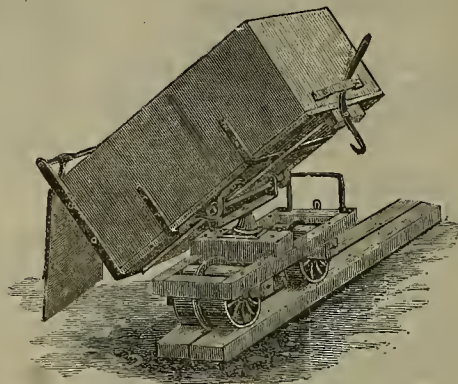
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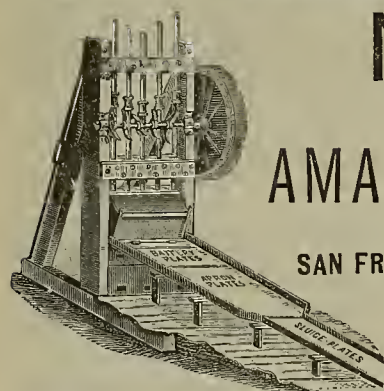
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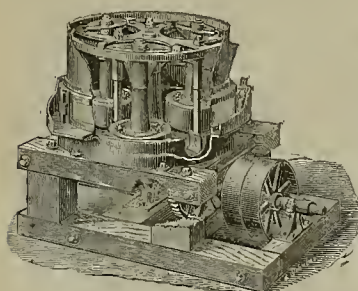
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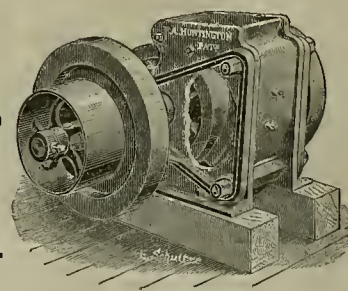


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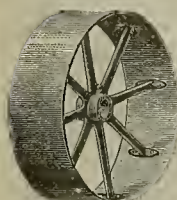
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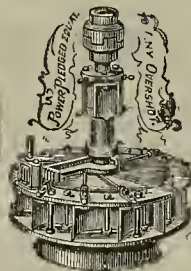
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New York Belting and Packing Company's Rubber Goods.

Lane and Bodley Saw mills.

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FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.



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ESTABLISHED 1860.

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J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Drills, Furnaces, Churns, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).

Orders Promptly Executed



Metallurgy and Ores.

SELBY

SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY

And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD.

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,

Under Chamberlin Patent.

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ASSAYER AND ANALYTICAL CHEMIST.

113 Leideedorf Street,

Bet. California and Sacramento Sts., SAN FRANCISCO

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Personal attention insures Correct Returns.

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IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG- OISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Old and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

Nevada Metallurgical Works.

NO. 28 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1860

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

THOMAS PRICE'S

ASSAY OFFICE,

CHEMICAL

LABORATORY,

Bullion Rooms and Ore Floors,

No. 524 Sacramento Street,
San Francisco.

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METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leideedorf Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters. Mines Examined and Reported on.

Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

C. H. AARON,

ASSAYER AND METALLURGIST,

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona,

A Card.

EDITORS PRESS:—The annexed card, with a signature which I cannot read, comes to me with the refreshing and wholesome effect of a slapped face to a spoiled child:

I have read your work on testing and working silver ores. It is almost too sketchy for practical purposes. People might adopt your system to your benefit if they were made to understand it better, etc.

D.

San Francisco.

Since reading this I have been somewhat in the position of the Irishman who was "blne moulded for want of a bating." Surfeited with the praises of those who like my books and other writings, it began to be a question as to whether I had soared above or sunk below the notice of intelligent criticism, and I feared the latter from the fact that I am far from feeling satisfied with many of my own productions.

And yet commendation comes from competent sources. Only two days ago I received a letter from a *rival author*, who is gracious enough to say, speaking of my "Assaying," "I consider your work, both parts, as the best little hand-book on the subject. I have studied and I possess about everything that has appeared during the last thirty years."

I am not proud of "Testing and Working Silver Ores," neither am I ashamed of it. It was originally published many years ago, as years go nowadays, was my first attempt at a book (except a little pamphlet previously), sold very well and, as I know from abundant testimony, did some good. It accomplished, in some measure, the purpose of its creation which was to assist poor miners. The only direct benefit that ever accrued to me from the process described, or attempted to be described, was in my personal use of it for myself or others.

The book was, as Messrs. Dewey & Co. know, in active demand for years after it was supposed to be out of print, and the reason of its reappearance now in its original form is that a number of unbound copies were mislaid and have recently come to light. I, myself, should have preferred a new edition.

The extension of railway facilities and the multiplication of metallurgical centers, first suggested many years since by me in your columns, have greatly changed the aspect of metallurgical possibilities, yet not so greatly but that this excellent process, essentially 300 years old, may still find useful application in many a nook and corner of our vast metalliferous regions, and, notwithstanding the crudities of the book, "any person of ordinary sagacity, and possessing, as is presupposed in the book itself, a fair knowledge of ordinary milling, might, I think, gather from it sufficient information to enable him to work successfully."

This is the first time within my knowledge that I have been accused of not making myself clearly understood—at least by the special class addressed. I do not expect to make a metallurgist out of a harber's clerk by any amount of mere writing. When I have written for chemists or metallurgists I think they have understood me, whether accepting my conclusions or not, and I have been led to believe that the unquestioned popularity of my other efforts has been mainly due to the fact that they could be comprehended by those for whose use they were intended.

If the writer of the card has bought my book and is sorry for it, I am sorry for it; but I suspect he only borrowed it, and had therefore but little time in which to assimilate its contents. I will venture to assure him that if he will do precisely what the book tells him in plain English to do, he will attain the results indicated, but I confess that he will have to furnish at least a modicum of brains for his own use (I forgot to mention that article in the book), and if he is ignorant of the meaning of such a term as "panning out," if he does not know how to strain amalgam, if he cannot distinguish a piece of galena from a lump of coal, he will have to undertake a course of preparatory study before he will be competent to understand even so simple a treatise as mine on "Testing and Working Silver Ores."

C. H. A.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

State Line, April 10, \$4000; Standard Con., 7, \$5971; Bodie Tunnel, 7, \$2158; Con. California and Virginia (for March), \$141,474; Stonewall, 3, \$3000; Hanauer, 6, \$9440; Stormont, 7, \$2957; Queen of the Hills, 7, \$4057; Hanauer, 9, \$2645; Queen of the Hills, 9, \$1200; Alice, 10, \$20,845; Germania, 10, \$2843; Hanauer, 10, \$2650; Queen of the Hills, 10, \$1250; Hanauer, 11, \$2540. There were shipped to the East from Salt Lake on the Utah Central railroad during the week ending April 10th, the following: Twenty-five cars of bullion, 625,431 pounds; five cars iron matte, 133,860 pounds; two cars copper ore, \$60,800 pounds, and two cars sulphur, 56,000 pounds. Wells, Fargo & Co., Salt Lake, received for week ending April 7th in bullion, \$38,415; McCormick & Co., \$47,770; Union National Bank, \$13,202.

STOP, no trifling with my eyes! I will go to Muller, the optician, 135 Montgomery street, near Bush, opposite Occidental,

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.		
Alpha Con M Co.	Nevada.	2.	50.	Mar 4.	Apr 29.	W Willis.	309 Montgomery St.	
Ruena Vista Petroleum Co.	California.	33.	1 60.	Mar 16.	Apr 20.	J Morizio.	328 Montgomery St.	
Boston M Co.	California.	1.	12.	Mar 6.	Apr 10.	M McDonough.	Grass Valley	
Con Anador M Co.	California.	11.	1 00.	Apr 7.	May 10.	F E Lathan.	327 Pine St.	
Crocker M Co.	Arizona.	2.	20.	Mar 10.	Apr 13.	May 21.	A Waterman.	309 Montgomery St.
Champion M Co.	California.	21.	10.	Apr 13.	May 20.	June 6.	T Wetzel.	522 Montgomery St.
Gold Point Con M Co.	California.	9.	01.	Mar 20.	Apr 24.	May 15.	A B Brady.	Grass Valley
Cover Improvement Co.	California.	1.	50.	10.	Feb 8.	Mar 23.	R N Van Brunt.	318 Pine St.
Gould & Curry M Co.	Nevada.	40.	30.	Mar 27.	Apr 30.	May 22.	A K Darbrow.	309 Montgomery St.
Lucky Hill Con M Co.	Nevada.	3.	05.	Apr 5.	June 7.	July 7.	F D Black.	27 Ellis St.
Martin White M Co.	Nevada.	21.	25.	Mar 16.	Apr 20.	May 20.	J J Seoville.	309 Montgomery St.
Manhattan M Co.	California.	3.	01.	Mar 20.	Apr 24.	May 15.	A B Brady.	Grass Valley
Ruby M Co.	California.	11.	11.	Apr 3.	May 6.	May 24.	J J Mitchell.	Grass Valley
North Banner Con M Co.	California.	11.	11.	Apr 20.	Apr 24.	May 15.	A B Brady.	Grass Valley
North Belle Isle M Co.	Nevada.	10.	20.	Mar 2.	Apr 6.	Apr 28.	J W Few.	310 Pine St.
Peerless M Co.	Arizona.	7.	25.	Mar 3.	Apr 5.	Apr 27.	A Waterman.	339 Montgomery St.
Planet Con M Co.	California.	14.	01.	Mar 2.	Apr 3.	Apr 27.	M Byrne.	Grass Valley
Pennsylvania M Co.	California.	4.	01.	Mar 22.	Apr 4.	May 18.	M Byrne.	Grass Valley

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Anglo-Mexican M Co.	Mexico.	C A Moore.	217 Sansome St.	Annual.	May 6
Morgan M Co.	California.	C S Neale.	230 Montgomery St.	Annual.	May 1
Ruby M Co.	California.	H Piche.	230 Montgomery St.	Annual.	May 4
Russel Reduction Co.	California.	J Morizo.	328 Montgomery St.	Annual.	Apr 30
San Jose De Gracia M Co.	Mexico.	C A Moore.	217 Sansome St.	Annual.	May 10

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Caladonia M Co.	Nevada.	W L Oliver.	328 Montgomery St.	10.	Feb 23
Con Virginia & California M Co.	Nevada.	A W Havens.	309 Montgomery St.	30.	Feb 12
Derbec Blue Gravel M Co.	California.	T Wetzel.	522 Montgomery St.	10.	Feb 9
Holmes M Co.	Nevada.	O E Elliott.	339 Montgomery St.	25.	Mar 20
Monro M Co.	California.	G W Sessions.	359 Montgomery St.	25.	Mar 10
Manhattan S M Co.	Nevada.	John Crocker.	419 California St.	25.	Feb 17
Silver King M Co.	Arizona.	J Nash.	328 Montgomery St.	25.	Mar 15

Mining Share Market.

There never has been a time since mining stocks were first quoted, when less interest has been manifested in their "values" than is the case at the present time. Five and ten cent fluctuations are about all there are to record. Neither the Comstock in Nevada, nor Bodie in this State, are showing up anything to make the market any better, though diligent work is progressing on the principal mines in the hope of finding bonanza ground. Even good paying ore without much bonanza to it would be heartily welcomed. On the Comstock a large amount of expensive exploration work is being done not only in the middle mines, but also in the north and south end sections. Huge quantities of low grade ore are daily forwarded to the various mills for reduction, and if there were more mills they would be furnished plenty of work through more mining being brought to bear in the premises. The Consolidated California and Virginia, Crown Point Belcher, Yellow Jacket, etc., furnish several hundred tons of ore per day, keeping numerous men at work where otherwise men and families might go hungry. Exploration work is not at all neglected in these low grade ore propositions. Men are employed at this in the several mines mentioned, opening up further ore resources, and seeking for something better and more important. Good steady progress continues to be made, reducing the water in the Osiston shaft, yet this is necessarily slow, owing to the great extent of ground to be drained. Large shipments of ore from the Consolidated California Virginia mine are daily made, the old ore stopes of the upper levels are turning out ore of improved quality as well as quantity.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department No. San Francisco:

THOMAS J. VEATCH DRUG AND MEDICINE CO., April 10th. Directors, Thos. J. Veatch, A. A. Glascock, A. M. Silverstein, J. G. Libbey and W. H. Worden.

GUILD G. M. Co., April 13.—Capital stock, \$1,000,000. Directors, E. Green, Geo. W. Osborn, A. Judson, C. Stevens and Mark Shepard.

EXCELSIOR REDWOOD CO., April 13.—Capital stock, \$1,000,000. Directors, Chas. A. Hooper, Geo. W. Hooper, Joseph Russ, David Evans and John F. Houlton.

SOUTHERN PACIFIC BRANCH RAILROAD CO., April 12.—Object to build and operate a standard-gauge railroad from a point near San Miguel, San Luis Obispo county, and running in a general southeasterly direction a distance of about 250 miles through San Luis Obispo, Santa Barbara, Ventura and Los Angeles counties, connecting with the Southern Pacific at Newhall, in Los Angeles county. Directors, Chas. F. Crocker, N. T. Smith, W. V. Huntington, W. E. Brown, Timothy Hopkins, S. T. Gage and L. L. Wilcutt. Capital stock, \$10,000,000 in 100,000 shares.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

MOUNT WHITNEY AND SURROUNDINGS.—Capt. J. M. Keeler, of Inyo county, will next week deliver a lecture in Oakland, descriptive of Mount Whitney and the region surrounding it. Capt. Keeler has a large number of stereopticon views of Inyo county scenery, many of them being very curious and startling. This is especially the case with those made from photographs taken on the summit of Mount Whitney, the highest peak in the United States. These views are thrown on a large screen by the aid of the lime-light and lantern, during Captain Keeler's descriptive lecture. The lecture and views have been presented in San Francisco and received great commendation, especially from the Geographical Society,

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MAR. 25.	WEEK ENDING APR. 1.	WEEK ENDING APR. 8.	WEEK ENDING APR. 15.
Alpha.	10.	15.	65.	85.
Alta.	30.	25.	39.	30.
Andes.	15.	25.	25.	25.
Argenta.	10.	10.	10.	10.
Belcher.	1 05.	1 10.	1 05.	1 15.
Belding.	1 15.	1 25.	1 40.	1 30.
Best & Belcher.	1 15.	1 25.	1 40.	1 30.
Bullion.	30.	35.	51.	39.
Bonanza King.	1 05.	1 10.	1 05.	1 15.
Belle Isle.	1 25.	1 40.	1 25.	1 10.
Bodie Con.	1 05.	1 10.	1 10.	1 20.
Bodie Tunnel.	1 05.	1 10.	1 10.	1 20.
Bulwer.	1 05.	1 10.	1 10.	1 20.
California.	2 05.	2 25.	2 10.	2 25.
Challenge.	15.	15.	15.	15.
Champion.	15.	15.	15.	15.
Chollar.	1 10.	1 15.	1 10.	1 20.
Confidence.	1 15.	1 25.	1 10.	1 25.
Con. Imperial.	2 05.	2 25.	2 10.	2 25.
Con. Virginia.	2 05.	2 25.	2 10.	2 25.
Con. Pacific.	2 05.	2 25.	2 10.	2 25.
Crown Point.	1 05.	1 10.	1 10.	1 20.
Day.	1 05.	1 10.	1 10.	1 20.
Eureka Con.	1 05.	1 10.	1 10.	1 20.
Eureka and.	1 05.	1 10.	1 10.	1 20.
Essex.	1 05.	1 10.	1 10.	1 20.
Grand Prize.	1 05.	1 10.	1 10.	1 20.
Gould & Curry.	1 05.	1 10.	1 10.	1 20.
Goodshaw.	1 05.	1 10.	1 10.	1 20.
Hale & Norcross.	1 05.	1 10.	1 10.	1 20.
Holmes.	1 05.	1 10.	1 10.	1 20.
Independence.	1 05.	1 10.	1 10.	1 20.
Julia.	1 05.	1 10.	1 10.	1 20.
Justice.	1 05.	1 10.	1 10.	1 20.
Martin White.	1 05.	1 10.	1 10.	1 20.
Monro.	1 05.	1 10.	1 10.	1 20.
Mexican.	1 05.	1 10.	1 10.	1 20.
Mt. Diablo.	1 05.	1 10.	1 10.	1 20.
Northern Belle.	1 05.	1 10.	1 10.	1 20.
Northern.	1 05.	1 10.	1 10.	1 20.
Occidental.	1 05.	1 10.	1 10.	1 20.
Ophir.	1 05.	1 10.	1 10.	1 20.
Overman.	1 05.	1 10.	1 10.	1 20.
Potosi.	1 05.	1 10.	1 10.	1 20.
Practical.	1 05.	1 10.	1 10.	1 20.
Sage.	1 05.	1 10.	1 10.	1 20.
Silver King.	1 05.	1 10.	1 10.	1 20.
Sierra Nevada.	1 05.	1 10.	1 10.	1 20.
Sierra.	1 05.	1 10.	1 10.	1 20.
Silver Hill.	1 05.	1 10.	1 10.	1 20.
Silver King.	1 05.	1 10.	1 10.	1 20.
Scorpion.	1 05.	1 10.	1 10.	1 20.
Syndicate.	1 05.	1 10.	1 10.	1 20.
Toga.	1 05.	1 10.	1 10.	1 20.
Utah.	1 05.	1 10.	1 10.	1 20.
Utah.	1 05.	1 10.	1 10.	1 20.
Yellow Jacket.	1 05.	1 10.	1 10.	1 20.

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Apr. 15.	50 Hale & Nor.	2 55	
100 Andes.	25c	575 Holmes.	4 50 @ 4 75
140 B. & Belcher.	1 25	50 Mt. Diablo.	3 75
200 Bodie Con.	1 45	25 Nevada.	1 10
200 Bulwer.	6 25	20 Ophir.	1 10
100 Bullion.	45c	200 Overman.	25c
100 Chollar.	85c	1050 Potosi.	5 10
100 Con. Pacific.	20c	300 Savage.	1 10
100 Con. Pacific.	20c	100 Utah.	1 10
100 Gould & Curry.	70c	100 Yellow Jacket.	70c

San Francisco Metal Market.

[WHOLESALE.]	
THURSDAY, April 15, 1886.	
ANTIMONY—Per pound.	— @ —
Hallet's.	12 @ —
Cookson's.	13 @ —
BORAX—San Bernardino.	— @ 8
Armstrong.	— @ 6 1/2
IRON—Glenbrook ton.	22 50
Eginton, ton.	20 50 @ 21 50
American Soft, ton.	24 00 @ —
Oregon Pig, 100.	— @ —
Copper (No. 1).	22 00 @ 23 50
Clay Lane White.	22 50 @ —
Shotts, No. 1.	23 50 @ —
Steel—English, lb.	15 @ —
Black Diamond, ordinary sizes.	2 @ —
Flow.	5 @ 6
Machinery.	8 @ 10
Sanderson Bros.	13 @ —
COPPER—	
Brass—sized.	17 @ —
Fire-box sheets.	20 @ —
Bolt.	17 @ —
Sheathing.	— @ —
Ingot.	13 @ 14
Lead—Fig.	4 50 @ 4 75
Bar.	4 @ 4 1/2
Pipe.	7 @ —
Sheet.	8 @ —
Shot, discount 10% on 500 bag.	1 85 @ —
Buck, 1/2 bag.	2 05 @ —
Chilled, do.	2 25 @ —
ZINC—German.	9 @ 10
Sheet, 7 1/2 ft. to 10 ft. less the cast.	7 1/2 @ —
QUICKSILVER—By the disk.	62 00 @ 63 00
Flasks, new.	1 05 @ —
Flasks, old.	85 @ —
Tin Plate—Coke.	5 15 @ 5 50
Charcoal.	5 15 @ 5 25
NEW YORK PRICES.	
California Borax.	6 1/2 @ 7 1/2
Pig Iron, American.	17 @ 18 00
Quicksilver.	43 @ 45 1/2
Australian.	20 @ 20 80
Bar Silver.	1 01 @ —
Lead.	4 85 @ 4 95
Copper.	11 50 @ 11 62 1/2
Refined Silver (per cent discount).	20 1/2 @ 21 1/2

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 262 Market St., S. F.

FOR WEEK ENDING APRIL 6, 1886.

- 339,252.—FAUCET AND BUSHING—M. Anthony, S. F.
- 339,127.—SIPHON—Geo. W. Arper, East Oakland, Cal.
- 339,381.—ELECTRIC SIGNAL RECORDER—A. J. Coffee, Portland, Oregon.
- 339,153.—INCUBATOR—Davis & Look, East Oakland, Cal.
- 339,283.—FOLDING BEDSTEAD—B. F. Farrar, S. F.
- 339,540.—APPARATUS FOR TREATING LIQUORS BY ELECTRICITY—E. J. Fraser, S. F.
- 339,541.—TREATING LIQUORS BY ELECTRICITY—E. J. Fraser, S. F.
- 339,296.—CONCRETE ARCHES—P. H. Jackson, S. F.
- 339,557.—FRUIT DRIER—H. S. Jory, Salem, Oregon.
- 339,305.—RAILROAD SWITCH AND SIGNAL—E. Y. Knapp, Arcata, Cal.
- 339,309.—STOVE DOOR—D. L. Luddington, Grass Valley, Cal.
- 339,571.—GARMENT—A. W. Mensor, Jacksonville, Oregon.
- 339,459.—GATE—E. H. Penfield, Santa Barbara, Cal.
- 339,215.—TWO-WHEELED VEHICLE—S. Rothlisberger, Stockton, Cal.
- 339,480.—OIL CUP—F. O. Slanker, Pomona, Cal.
- 339,247.—SAD IRON—M. Viroche, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

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FINE PICTORIAL ENGRAVINGS
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BEST AND CHEAPEST PRACTICAL METHODS
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OTHER SPECIAL PHOTO WORK,
including the reproduction and printing of photographs for salesmen, stereopticon views, portraits, scenery, natural specimens, etc. All promptly and reliably done by the most successful and best approved processes. Favorable rates guaranteed to transient customers, and all trade, professional and commercial firms.

Send, as early as possible, with full description as practicable, of any work wanted, stating size and for what use plates are wanted. Photographs, and other prints similar to those desired, will aid us in making definite estimates.

If requested we will send an assistant to give information and make estimates in the city.

Call and see specimens, or write for samples and prices and any further information wanted, to

S. F. PHOTOGRAPHING CO.,

659 Clay St., S. E. cor. Kearny, S. F.

ASSESSMENT NOTICE.

Santa Anita Mill and Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Nevada county, Cal.

NOTICE is hereby given, that at a meeting of the Directors held on the 31st day of March, 1886, an assessment (No. 9) of two cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, room 4, 309 California Street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 27th day of April, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 17th day of May, 1886, to pay delinquent assessment, together with costs of advertising and expenses of sale.

J. M. BURNINGTON, Secretary.
Office—Room 4, No. 309 California Street, San Francisco, California.

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Co.

ASSESSMENT No. 52.

Levied.—March 27, 1886
Amount.—Forty Cents per Share
Due in office.—April 30, 1886
Sale Day.—Tuesday, May 25, 1886

ALFRED K. DURBROW, Secretary.

Office—Room 09, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

TO MINE OWNERS.

WANTED.—By competent man, a position as assayer or millman; has No. 1 assay outfit. References. Address "M," this office.

HEALD'S BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.

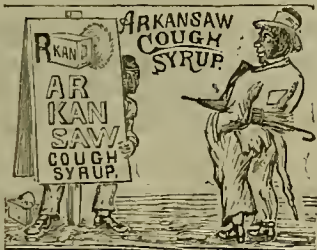
Rural Health Retreat (Crystal Springs,) St. Helena, Cal.



Among the many delightful places for rest, recreation and restoration of mind and frame in California, is the "Crystal Springs Rural Health Retreat," shown in above engraving on this page. The Retreat is situated on the slope of Howell mountain, 1200 feet above tide level, 500 above and over-looking Napa Valley, and two and a half miles from St. Helena, in Napa county. Among the natural advantages are stated: "pure water, dry atmosphere, balmy sunshine, even temperature, mild breezes and the absence of high winds. Across the valley lies the Sonoma mountain range, breaking the sea breeze and shielding the Retreat from the chilling atmosphere of the coast, and presenting a safeguard against catarrh and lung diseases. The grandeur of its mountain ranges, with shrubby canyons lying in beauty at their feet, the famous Mt. St. Helena rearing its lofty head to the clouds, the grassy plain lying beneath, reflecting the sunbeams like a grand mirror before the Retreat, all perfumed with a variety of wildflowers, lend an enchantment to the scene. There are no stagnant pools or marshes within range; rainfall is plentiful, rendering irrigation unnecessary, and malaria is a stranger at the Retreat, and in all this beautiful valley. In fact, the purity of the air on this hillside and in the upper valley is a

specific for malaria, and all diseases affecting the head, throat and lungs, producing a healthy circulation through the mucous passages generally." The Rural Health Retreat is twofold in its character. In the first place it undertakes to do direct work in the cure of diseases by hygienic and rational practice, by thoroughly competent physicians resident in the Retreat. While a radical table is furnished for invalids, and proper diet prescribed for each individual case, no one is confined to a starvation diet, and better and more ample variety is furnished at meals than is usually found upon invalid tables elsewhere. The managers have the services of two thoroughly competent physicians from Eastern cities of many years' experience in practice. They are assisted by two lady attendants having a two-years' course at one of the largest hygienic and surgical sanitariums in the world, with five years' subsequent practice. The Retreat is also a summer and winter resort to all who desire to spend a few weeks or months in recreation, and receive the benefit from rest and breathing this mountain air, whose healthfulness and purity is unsurpassed. For such, a liberal table is especially provided. While the chief object of this institution is to afford a sanitarium for those in need

of hygienic and surgical treatment, ample means are afforded for recreation, and entertainment is provided for all boarders and pleasure-seekers who love decency and good order. Winding and picturesque roads, walls of blasted rock terracing the sidehills about the main building, cottages and drive ways, a fine campus, spacious woods, shady groves, arborescent seats, swings, swinging rings, swinging chairs, will be furnished: dumb-bell and Indian club exercises given to such as may desire them. Calisthenic exercises will also be led by a competent leader. To accommodate their increasing patronage, the proprietors are enlarging and building quite extensively, and in many ways improving their facilities for making the Retreat yet more comfortable for their guests. We feel an especial interest in the Rural Health Retreat, because one of the proprietors of the PRESS, with his family, has recently greatly enjoyed a recreation season there. They assure us that they are exceedingly well pleased with the Retreat for its natural and added beauties and comforts, and for the pure moral tone, the kindness and cordiality which prevail in the management. The accessibility of the Retreat should also contribute to its desirability, both to the invalid and the pleasure-seeker.



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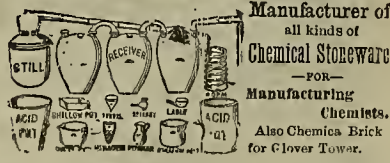
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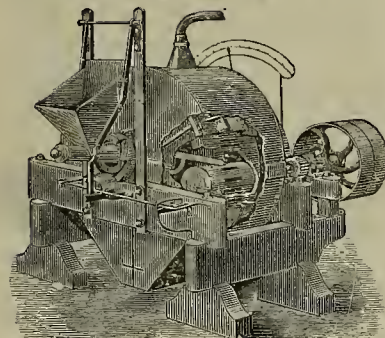
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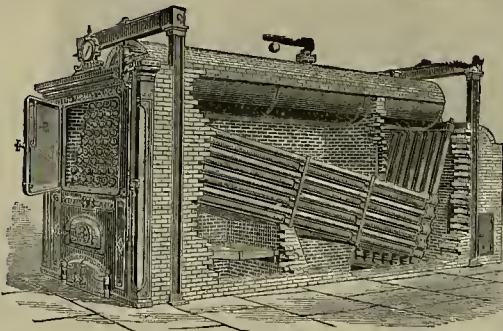
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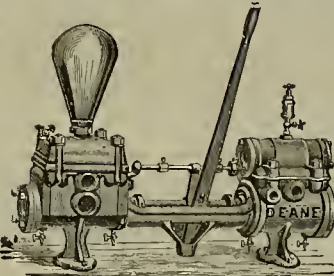
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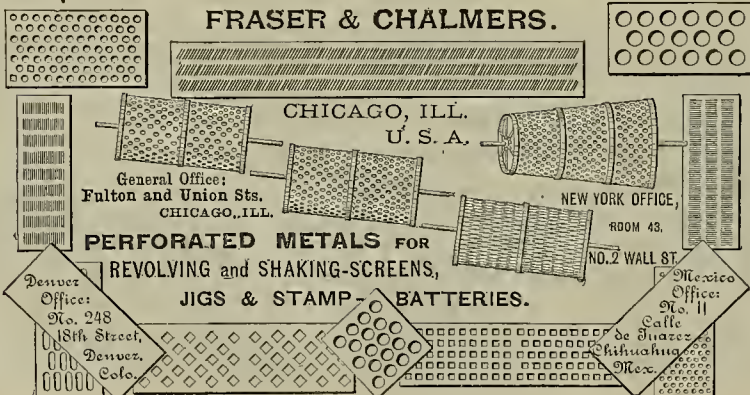
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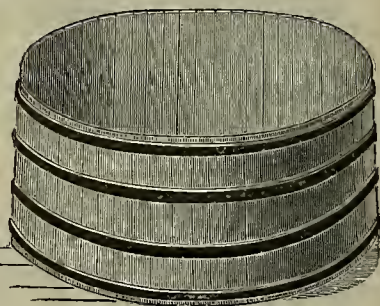
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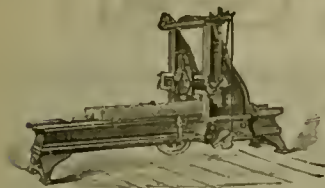
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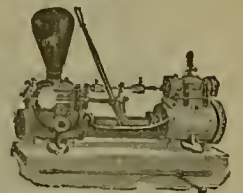
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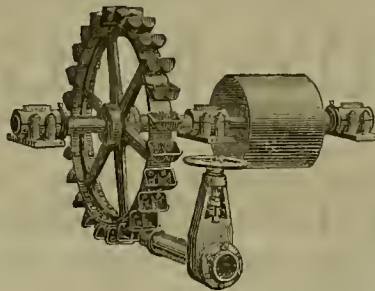
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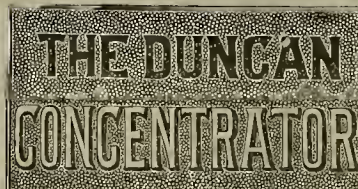
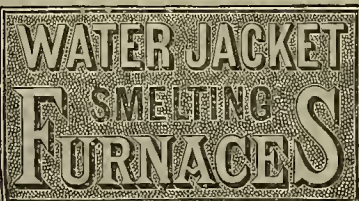
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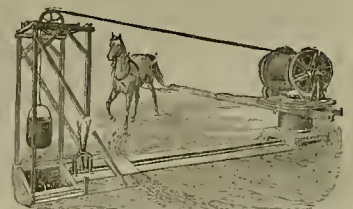
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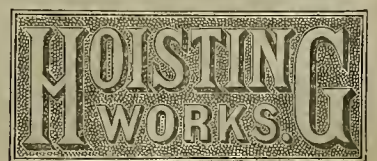


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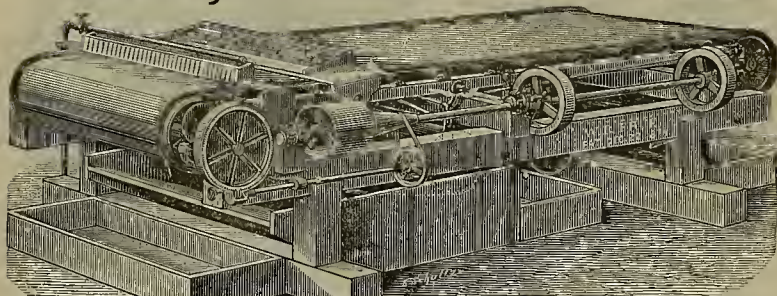
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The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

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SAN FRANCISCO, CAL.

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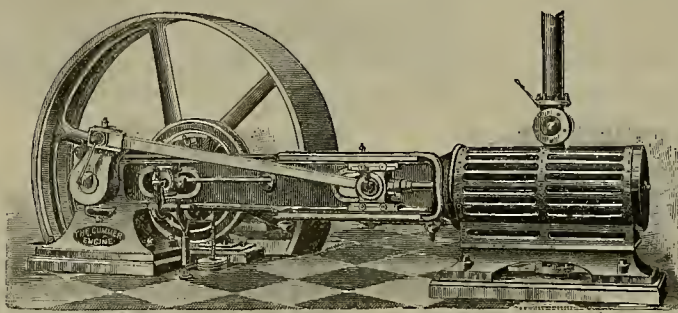
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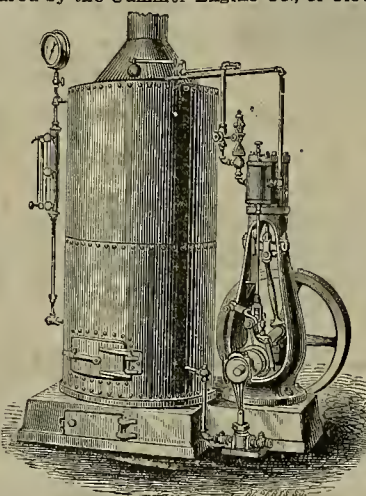
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, APRIL 24, 1886.

VOLUME LII
Number 17.

A Long Tunnel Completed.

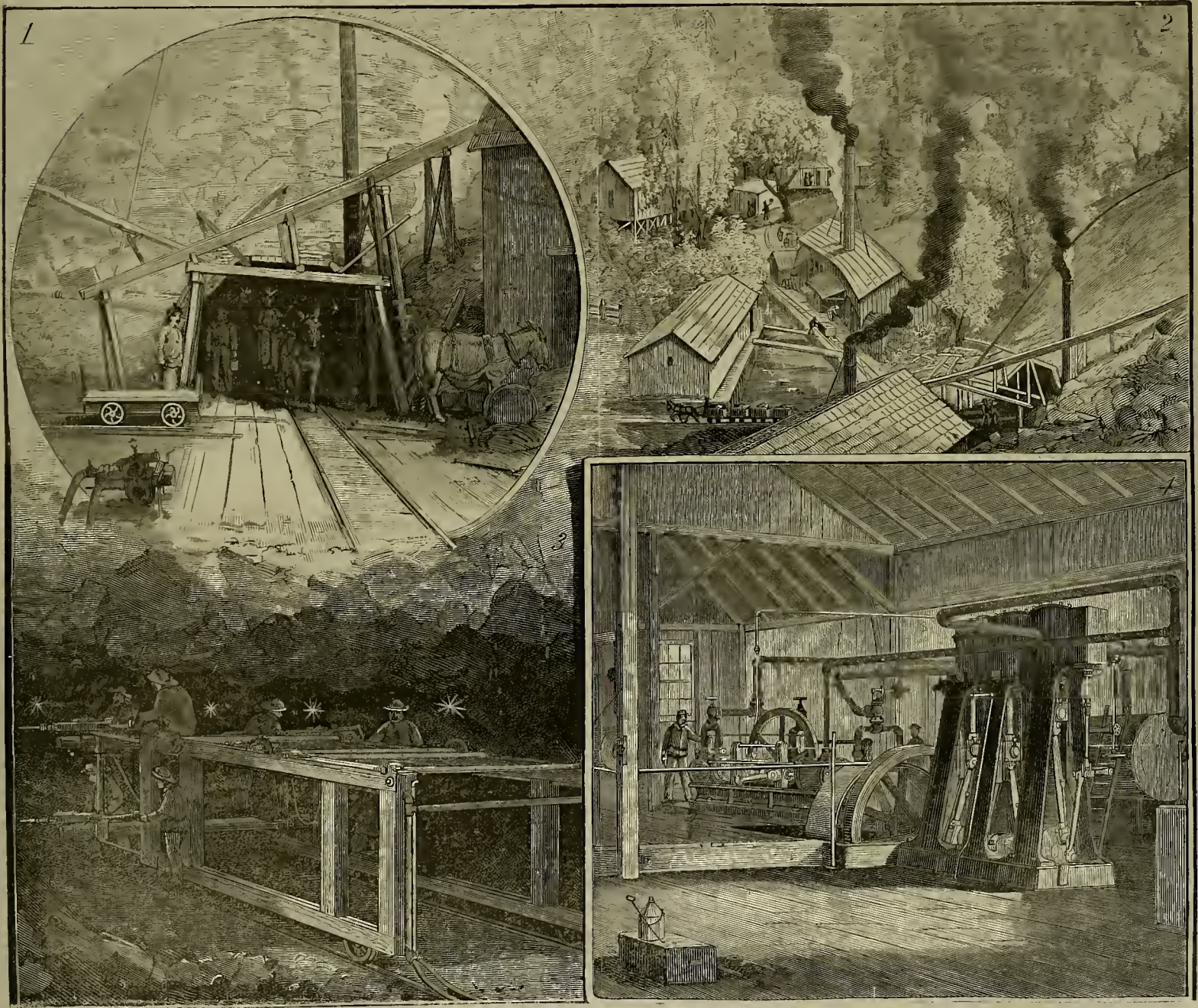
The Big Bend Tunnel on the Feather River—
An Extensive Mining Enterprise.

The most extensive tunnel and river mining
enterprise carried on in California for many

menoeed, in November, 1882, we gave some account of the enterprise, but there are many features of interest to the mining community which can now be recorded on the completion of the work. It is a noticeable and somewhat remarkable fact that the tunnel has been fin-

the west branch, and finally reach the main river some distance below the Bend. When the water is diverted through this tunnel it will leave exposed about 14 miles of the bed of the river, in the Bend. A glance at the accompanying map will show the location of the tunnel

chine drilling began. Two days later a night shift was put to work, and on the first of the following month three shifts of eight hours each were established. When the operations first began, the plant consisted of a No. 4 Burleigh air compressor, so arranged that it could be driven by



VIEWS AT THE BIG BEND TUNNEL, FEATHER RIVER, BUTTE COUNTY, CALIFORNIA.

years is that of the Big Bend Tunnel Co., in Butte county, by which some 14 miles of the bed of Feather river will be drained so that gold mining operations may go on. To make the bed of the river accessible, it was necessary to run a tunnel 12,000 feet long, which would carry the water of the river at its low stages. This long and difficult undertaking was accomplished on the 12th inst., when "daylight" showed through at the end of the tunnel. At the time the undertaking was com-

ished at a cost considerably below the original estimates—something that seldom occurs in enterprises of this kind.

In the summer of 1882 preliminary surveys were made by James McGann, at that time county surveyor of Butte, and Mr. N. A. Harris, the superintendent of the company. These surveys showed that a tunnel 12,000 feet long, with an average grade of 30 feet to the mile, would carry the waters from above the Bend to Dark canyon, from which they would pass to

with reference to the Bend. The map shows the whole property of the company. The etched or darker portions represent the sections and part sections of land, which, in addition to the river bed and banks are owned by the company. A longitudinal section of the tunnel is shown on the same plate.

The Machinery.

When they started on the tunnel 26 feet were run by hand work to get a face ready for the air drills, and on November 18, 1882, the ma-

steam or water power, an air tank, 4x16 feet, a No. 3 Knowles pump, a 2x8 feet Lawellyn heater, an 8 feet Knight water wheel and fittings, a Buffalo drill carriage mounting four drills, and a complete tubular hoiler, 5x16 feet. Since then there have been added four Burleigh tunnel drills, a No. 4 Clayton duplex air compressor, a No. 5 Baker blower, and an engine to run the blower. It is worthy of note that the superintendent states that 10 hours

(Continued on page 276.)

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Northern California Mines.

EDITORS PRESS:—The Black Bear, at Sawyer's Bar, is running on fair-grade quartz and doing an even business. Bennett's placer claim, near the Forks Salmon, is running steadily and doing well. At Oliver's the sluice was robbed about the middle of March; estimated loss, \$2000. Heald, at Rock creek, is taking out good pay. Alverson & Co., at Horseshoe Bend, are mining. Ten Eyck & Dodge are running on good time, with satisfactory results. Mockerson & Nelson, ditto. At Orleans Bar, Hamilton & Weymouth and Wilder & Perch are cleaning up good run and expect to make a most profitable season. At Red Cap, Allen & Lord are cleaning up very good pay. At Big Bar, Reese is setting in to run on low bar, where he calculates on a big cleanup. At Saint's Rest, Wm. Lord has been having a good deal of trouble with his flume this season, but he is one of the best mine managers on the river, and he is getting this mine in thorough running order. In early days this mine was one of the gilt-edged claims. At Wertchepec, Lord & Smith are running pretty steadily, making a fair profit over expenditures. Capt. Young, just above Kappel Creek, has been stripping off for several weeks, but is now getting down to pay gravel.

At Shragon Wm. Lord is steadily running the Seckwan mine, at good pay. He has not yet got down to bedrock on the lower channel. Those who know the mine best think he will strike it rich when he cleans up bedrock.

At Klamath Bluffs Messrs. Jacobs and Starr are running a tunnel on bedrock level doing assessment work. This is probably one of the best placer mining properties on the river. They call it the Cleveland and Hendricks mine and is covered by a magnificent water privilege. The owners are endeavoring to negotiate for the capital to put the water on.

On Redwood creek which puts into the ocean south of the Klamath, Dr. Hood is getting ready to break ground on his canal which is to convey water from Redwood creek on to the far famed Gold Bluffs which are located on the coast nine miles south of the Klamath river. It is probably the most gigantic placer mining scheme ever undertaken. It would require a lengthy letter to give the details and describe the ground. I think we have a silver boom near at hand. Some very promising ore and finely developed ledges have recently been discovered in this vicinity, easily accessible, with limitless water power close at hand. I may be able to speak more definitely before long. WM. AYRES.

Nanaper Ranch, April 7.

Southern Oregon Mines.

EDITORS PRESS:—Southern Oregon is enjoying a small boom in mining. We have a large number of veins which are known to carry gold, a great deal of quartz mining having been done in an early day. The principal mines now worked are on Wagner and Jackson creeks, not far from here. There has been one claim sold (reported) for \$10,000. This is on Jackson creek. The Walsh & Bragdon mine, on Wagner creek, is being worked, Messrs. Koehler & Brandt, of the O. & C. R. R. being interested. They are putting in a new mill for working the quartz, which is said to run high.

Mr. L. D. Brown, a Portland capitalist, has built a steam mill at Jacksonville, which is steadily crushing quartz. It has a rock-breaker of the Jones patent—a first-class machine whose capacity is 70 tons per day. There are no stamps, but in place of them a pulverizer called the Salmon machine, which works easily 10 tons of rock per day, crushing wet and amalgamating in battery. The principle of the machine is hard to describe although the apparatus is very simple. It cannot get out of order, it amalgamates well and crushes twice as much as the same amount of power applied to stamps. It is also much cheaper than stamps. The mill has a Frue Vaoner which saves the sulphurets. The power is supplied by a portable steam engine. The capacity of the mill is 10 tons per 24 hours.

There is a small prospecting mill at the Blackwell mine which has been running at intervals for two years; also one at Medford of limited capacity. These are not now running. A great deal of work is being done in prospecting and mining upon veins. I will keep you posted. Ashland, Oregon. X.

Two young men, says the St. Helena (Or.) Columbian, arrived at Granite creek not long ago for the purpose of making an easy fortune. On arrival they proceeded at once to prospect. One of them got down on his knees by the edge of the creek and carefully scanned the gravelly bottom, and reported to his companion that there was no gold to be seen. The other got down and took a look and came to the same conclusion. Both of them decided that there was no gold in Granite creek and that the whole thing was a sell, and both returned by the first pack train.

A Fatal Case of Trichiniasis.

The first death from trichina ever known in this township took place in Livermore, on Monday last. The victim was a young man named John Martens, a nephew of Jacob and John Johnson, of this place. He was taken ill about four weeks ago, with all the symptoms of typhoid fever, and it was only within a few days of his death that the nature of his disease was suspected. He then stated that about a week before he was taken ill, he had prepared and eaten a dish of chopped raw pork and beef. This pork must have contained the trichina. Dr. Taylor, who had charge of the case, sent to the city for an instrument with which to make an examination of the case, but before its arrival, the man died.

Martens was a German, about 19 years of age, and had been in this community about four years. He was in the employ of Peter McKeany, of this place. An examination of minute portions of the flesh of the deceased were made by Dr. Taylor, under the microscope, when the trichina were distinctly seen. The worm is but 1-24th of an inch in length, but when magnified 1,000 diameters, its entire internal structure is plainly visible. The trichina is only dangerous when the pork which contains it is either eaten raw or but slightly cooked. A heat of 170 degrees—much below boiling—will kill them, and prevent all danger. By the courtesy of Dr. Taylor a large number of our citizens were accorded an opportunity of examining the trichina worms, and familiarizing themselves with this terrible scourge.—Livermore Herald, April 10th.

As soon as we saw the above, we wrote to Dr. W. S. Taylor of Livermore, who is the physician named, asking for a specimen of the infested tissue for examination. He kindly forwarded it to us, and the examination discloses the trichinae as represented. In our letter to Dr. Taylor we asked especially what he could give about the origin of the pork which communicated the disease: as to whether it was Californian or Eastern. Dr. Taylor replied: "The victim was an employee in one of our meat shops. The hogs for the shop are purchased in small lots all over the valley, and kept in one common corral."

We conclude with regret that the disease sprang from California pork. We have claimed hitherto that our home grown pork was free from trichinae, and if we mistake not this is the first case on record in which the disease has come from the California product. Of course the trouble must be quite rare or it would have been heard from before. As we have the parasite domiciled in our hogs, and as death has been produced by it, it will be well to use extra precaution, and under no circumstances eat raw pork.

In view of the case reported it will interest many to read a fuller account of the dread parasite *trichina spiralis*. The disease trichiniasis, or trichinosis as it is sometimes called, was first traced to its cause in 1860 by Prof. Zenker although the nematoid worm trichina had been discovered and named as early as 1835 by demonstrators of anatomy, who found what was first called "speckled muscle" in the subjects they dissected. Before Zenker's discovery, in some cases epidemics of trichinosis were mistaken for cholera and treated for it; in other cases the disease was supposed to be typhoid fever. One author goes so far as to remark that trichinosis has been treated oftener as one of these diseases than as the trichina disease. Every year the number of such mistakes decreases, and there is at the present day no excuse for mistaking this serious disease for any other.

Concerning the recognition of the disease in the human subject, we must trust to the physicians. The examination of pork is a matter which anyone skilled with the microscope can undertake. In a report of the Calhoun County Medical Society some years ago, was an essay on trichine by Dr. D. C. Hauxhurst, from which we take a paragraph concerning the occurrence of this pest in the body of the hog:

"If it be desired to ascertain if the flesh of an animal contain trichinae, certain muscles should be examined first. The muscles about the loins and the diaphragm will present them in greatest numbers; next, the intercostal muscles may be examined. They are often very numerous in the deltoid and in the muscles of the eye.

The worm penetrates the coats of the stomach and goes directly into the diaphragm. To the muscles of the loins it passes from the intestines by way of the mesentery. Having been observed in muscles at a considerable distance from its breeding ground in the stomach and intestines within a comparatively short period, as in the orbital muscles, it has been suggested that this parasite penetrates the coats of the blood vessels, and is swept into the most distant localities by the circulation. I know of no certain evidence that this is the case. When once within the muscles, which seems to be their normal habitat, the trichinae make their way between the fibers and often travel long distances. Thus it happens that as they approach the tendinous attachments of the muscles, the converging channels between the fibers bring great numbers of them into a very limited space. For this reason, in examining a specimen of pork, the extremities of the muscle should be chosen. I have often found from eight to twelve thousand in these situations in one cubic inch.

In exploring for trichinae a one-inch objective is best. It may be found encysted, that is coiled up in a case or cyst. Sometimes this cyst is calcified and then in cutting the knife may be felt to grate upon the hard coating. Sometimes the case is not calcified and sometimes the worm is free and is seen looped or spirally coiled in various ways. The trichina in the specimen sent us by Dr. Taylor is free as would be expected in a recent invasion.

In looking for the trichinae one has to exercise some patience sometimes in teasing the fibers of the muscle apart, etc., until the outline of the worm or of the cyst is seen. When it is found, higher power can be used and the structure of the pest clearly seen.

Though the discovery of such an organism is unwelcome, it need not excite alarm, for it is well established that only by eating raw or partially cooked pork that there is danger of infection. Salting or smoking does not kill it, but thoroughly boiling or frying will do so. Be sure your pork is well cooked.

He Stayed With His Tunnel.

McKim is an honest Irish miner, who drifted off from Arizona a few years ago into Sonora. He had a little money, but a great deal of faith. Benham says: "I should say here that every mine that has been worked in Sonora, or, indeed, anywhere else in Mexico, has its early history recorded in the archives in the district. Thus, if a claim has laid idle half a century, and one wants to get its record, he has only to get the prefect or local authority of the district, and he is given access to the huge volumes that contain the information. McKim got hold of a claim that hadn't been worked for twenty years, and studied up its history. He found that the last year it was worked it took three shifts of eight men to pack the water out of the mine. He also found that the water increased so fast on them that the mine had to be abandoned, and from that he argued it was by no means exhausted. The problem then was to get the water out. But how? McKim had no money to put up pumps, but he did have a good deal of courage and a strong arm. He went down the hill and resolved to run a tunnel for the mine, to strike the ledge below the water pocket. Nearly five years ago McKim began to work, and for long years has pegged away at that tunnel. He had fully 600 feet to run. For about a year McKim had a brother Irishman to help him, but the latter got weary of the hopeless task, and for the remaining time McKim went it alone. About a year ago he noticed that the face of his tunnel was in moist, crumbly ground, and he got fearful that it would tumble in on him. He didn't go near the tunnel for several days for he was afraid of it. One morning he went up and found the water pouring out of the tunnel like a mill race. The water pocket had broken through and the tunnel was draining the old mine at the rate of 1000 barrels a minute. McKim was beside himself with joy. In a week he explored the mine through the old workings, and he found almost a bed of pure silver. Actually, he cut out cabinet specimens with a chisel. He sacks and ships the ore, and the little property is turning out \$100,000 a year with no other labor than that of McKim and two Yaqui Indians. So much for patient industry and four years of faith and hard work." Chicago Herald.

LOW-GRADE ORE.—A few years ago the violent fluctuations in stocks were due to rich ore hodies, homanza developments being struck in the lower levels at various points along the lode, and sanguine hopes and prospects of more being found. By degrees hope after hope failed and company after company ceased deep explorations, until finally the problem subsided into the low-grade ore proposition—working the extensive deposits of low-grade ore long known to exist in the old upper workings of the mines, and which had been passed in the eager search for something of more sensational importance and speculative value way down in the depths. There is very little of a speculative value in working these former leavings. It is merely a cold business proposition, a simple matter of figuring for a small profit and against possible loss in the daily workings of large amounts of this ore. There is no rivalry between mines on this proposition, and nothing in it to create rivalry or comparative excitement in the respective stocks. And the same may be said regarding the lower levels. The Hale and Norcross mine is the only one being worked below the pumping levels, so to speak, or at the lowest depths attained in the great lode, in which good ore and real paying prospects exist in tangible form. True, development work is proceeding at a corresponding depth in the Chollar and Potosi, yet no ore of value is found as yet, and the water is being pumped out of the Oshiston shaft with a view to deeper explorations in Best and Belcher and Gould and Curry, but, as before remarked, the Hale and Norcross ore development has none other at the lower levels to compare and compete with it as a potent ruling and alternative power in the stock market. By and by, when it shall be found expedient to sink the Combination shaft to the 3200 level, opportunity will be found to commence the regular hoisting of the ore from this Hale and Norcross development, when the resultant increase in price of the stock will be influenced principally by the milling returns and more active and extensive explorations in the mine itself.—Virginia Enterprise.

The State Line mine got \$4,000 from 10 days run of its 40-stamp mill.

Ore Concentration.

The Eureka Sentinel says: "Hons. M. D. Foley and Thomas Robinson left yesterday for the western part of the State and San Francisco. The two gentlemen are partners in a lease of several mining properties in Newark, this county, in which are large hodies of low-grade ore. The object of their trip together is to examine the concentrator in successful use at the Brunswick mill, on the Carson river, and then to decide upon one for use on the Newark ores. Motive power can be furnished cheaply right at their mines, and when once the work of concentration commences there is little or no doubt but that the hullion yield will more than meet their most sanguine expectations."

And the Carson Free Lance says: "There are now in this vicinity three kinds of gold concentrators in operation. There are at the Brunswick four of the Golden Gate; at the Mexican two of the Triumph; at the Santiago two of the Frue. A Golden Gate also is now being placed in position at the Vivian. There is now going on among the proprietors of these concentrators fierce competition for public favor. The greatest amount of ore daily is being crushed at the Brunswick, but the opposition claim that better work is being done either by the Frue or Triumph machine. This is not admitted by the proprietor of the Golden Gate. This little war among the mining men is of great interest to the general public, as upon the success of these concentrators largely depends the future prosperity of this section. At the Brunswick Armstrong, with four concentrators, reduces 130 tons of ore daily, and the assays show that only from 90 cents to \$1.15 per ton is lost in the reduction of Yellow Jacket ore. A day or two since we made a personal inspection of the Golden Gate concentrator at the Brunswick, and were delighted with its operations and pleased with the results already obtained. But best of all it pleases the men who have their money invested in it, and now it is said that it has more than paid its owners for the cost of its erection. Now \$8 gold ore from the Comstock can be reduced at the Brunswick at a profit and it is believed that there are in sight millions of tons of Comstock ore that will mill \$8 per ton. An additional ten years lease of life has been added to the Comstock by the invention of the Golden Gate and other concentrators."

To these paragraphs the Virginia Enterprise adds the following: With regard to the above there is no doubt that many classes of ores can be concentrated to very good advantage. This has been proven at Paradise Valley and other mining points in this State, as well as in California. Since the early days of the Comstock this principle has been recognized, the more especially in the concentration of tailings from the mills, the principal and simplest style of concentrator employed being the blanket sluice. Either of the three styles of mechanical concentrators mentioned above is good and very effective, and each claims advantages in some respects over the others, yet neither is altogether new or infallible. That at the Brunswick mill merely concentrates a certain deposit of free gold ore found in the Yellow Jacket mine, and perhaps might be used advantageously in the reduction of similar deposits elsewhere along the Comstock. But it must be understood that it is only the free gold, sulphurets and heavy base minerals that can be concentrated by either of these machines or any other. None of them can concentrate chloride ores, which constitute about seven-eighths of the great mass of the Comstock. If they could they would have been brought into extensive practical use long ago. The chloride which escapes the amalgamating pans and settlers of the mills can only be caught in reservoirs and slum ponds, while the sulphurets which escape with the tailings can be saved by blanket sluices and other concentrating appliances.

The ores out at Austin, in the Reese River district, are all worked by dry crushing, roasting with salt and amalgamating with quicksilver in the usual style of pans. By thus roasting with salt the sulphurets and other base metal combinations are destroyed or changed and resolved into chloride. Thus the ore is worked up to 97 per cent of its assay value from battery samples, and the tailings are absolutely barren and valueless. This most approved styles of concentrators have been tried on that class of ore in years past, but all failed to save the richest portion, the chloride, consequently it was found the most advantageous to turn the whole into chloride, thus saving about all the precious metal contained in the ore.

This is merely mentioned in illustration of the proposition that although there may be "in sight millions of tons of Comstock ore that will mill \$8 per ton," yet none of the concentrators mentioned can save more than about one-eighth part of it, generally speaking—that is to say, they can only save the free gold and the sulphurets.

In a late issue of the MINING AND SCIENTIFIC PRESS, is an interesting article on the "Exhaustless Gold Repositories of Sierra County," by Miles I'Auson, worthy of a careful reading by our miners, none of whom should be without a copy of this home journal, specially devoted to their interests.—Mountain Messenger.

Coal at Puget Sound.

What It Costs to Mine and Market It.

A reporter of this paper, says the *Seattle Chronicle* of Tuesday, visited this morning Mr. J. M. Colman, manager of the Cedar Mountain coal company, to obtain from him the amount it costs his company to mine and market the black diamonds.

In answer to a question as to the cost of mining the coal, Mr. Colman said:

"Our company would gladly pay miners \$1 per ton to mine the coal and put it on the cars. I understand it is claimed we can mine coal and put it into the bunkers at 56 cents a ton. You will see we are willing to give almost twice that amount for the work."

"What does it cost your company to bring coal to Seattle?"

"We pay 60 cents a ton over the C. & P. S. railroad for all coal shipped to San Francisco, and 85 cents for coal retailed in this city."

"What prices do you receive for your coal sold here and elsewhere?"

"I would first state," said Mr. Colman, "that about two-thirds of the coal mined is coarse and about one-third nut. A part of the coarse coal and a small amount of the nut coal are sold in our yards in Seattle. This coarse coal is screened before it is offered to the public. The coarse is sold here at \$3.50 per ton; the nut at \$2, and the screenings at \$1 per ton. The average price we receive here for the coal sold at our yards is \$3 per ton. The sales in this city amount to less than one-tenth of the output of our mines. The balance is shipped to San Francisco. On its arrival there about one-half of the coal is found to be coarse, one-fourth nut and one-fourth screenings. The coarse sells there at \$5.50 per ton, the nut at \$3.75 and the screenings at \$3.25. We receive on an average there \$1.50 per ton for our coal. It cost \$2.25 per ton for transportation from Seattle to San Francisco. Deducting this amount from the average price received, there would be left \$2.25 per ton."

"It has been alleged that our coal and that of the Oregon Improvement company are sold in San Francisco at \$8 per ton," continued Mr. Colman, "but the prices I have given you are all that we receive for the different kinds of our coal, and then it must be borne in mind always that the transportation from Seattle to San Francisco must be paid out of the prices realized in the latter place."

Upon the figures above given, anyone can calculate for himself the cost of mining and marketing and ascertain the margin left for the payment of other expenses, and for profit by noting the difference between that cost and the selling price. Let the calculation be made, for the sake of convenience, on 10 tons:

EXPENSES OF MINING AND MARKETING.

Cost of mining, per ton, from above interview.....	\$10.00
Cost of railroad transportation of one ton sold in the Seattle market.....	85
Cost of railroad transportation of nine tons sold in the San Francisco market.....	5.40
Total.....	\$16.25

PRICES RECEIVED.

For one ton sold in Seattle.....	\$3.00
For nine tons sold in San Francisco, after water transportation has been deducted.....	20.25
Total.....	\$23.25

From this it is seen that the cost of mining and transporting to Seattle 10 tons of coal is \$16.25, or \$1.62½ per ton; the amount received therefor is \$23.25, or \$2.32½ per ton, leaving a margin of 70 cents on each ton, out of which a multitude of expenses have to be met. In San Francisco, Mr. Colman informed the reporter, the expenses often reduced the margin to a very small figure, and sometimes entirely absorb it. For instance, the expense of maintaining the San Francisco yard, for rent, salaries and the like, foot up \$630 per month. If the coal is taken from the ship to the yards, there are the additional expenses of drayage, wharfage, etc. Wharfage amounts to 12½ and drayage to 25 cents on the ton. Sometimes a part of these expenses are avoided by the sale of the coal from the ship's side. The expenses of advertising, maintenance of the yard, etc., always go on. Then there is invested a huge sum by the company in placing the mine in condition to be operated. The cost of the plant of a coal mine differs from the cost of the plant of a manufacturing establishment in this: That when once the mine is exhausted, the original investment, be that \$100,000 or \$500,000, is absolutely lost; the plant of a manufacturing establishment, though it may depreciate, is never entirely lost.

By a close inspection of the above figures, and by careful consideration of the numerous necessary and incidental expenses that a mining company is compelled to meet, it will be seen that the profits are not at all exorbitant, but border close upon a loss. It requires the strictest watch and the application of sound business principles to prevent an institution of that kind from becoming submerged into debt.

The reporter having made the calculations as above tabulated, inquired of Mr. Colman when he expected to resume operation of his mine.

"We cannot restart our mine," he replied, "at the present prices of coal. The advance asked by our men in their wages would interfere with our starting. We could not meet their demands and operate our mine without losing money. Before we can think of resum-

ing operations there must be an advance in coal."

"I would like to contradict a statement that has been made to the effect that we closed our mines against our employees. While we were just skinning along the division line between profit and loss, we resolved to keep our mine running. However, our employees notified me in writing, and afterward the superintendent of the mine at Cedar mountain, verbally, that they would stop work unless their wages were advanced. This we could not do without suffering loss. They thereupon of their own volition refused to work, and withdrew from our employ."

California and Nevada Borax.

There is a danger menacing the borax industry of California and Nevada in the proposed changes in the duty on borax, borate of lime and all borates, in the Morrison bill now pending before Congress. A petition, numerous signed by citizens of California and Nevada, has been sent to Hon. Wm. R. Morrison, Chairman of Committee on Ways and Means, requesting that the same duty be placed on the crude forms of borax as is placed on the refined forms of the same. There are many reasons, as the petitioners state, why this protection should be granted.

1. There is a great abundance of this crude borax in this country; sufficient, in fact, to supply the wants of the United States for a long time to come, and needs protection in its exploitation as much as any product in the country.

2. These minerals belong mostly to citizens of the United States, many of them poor people, most of whom have entered the laude containing these substances, and paid the Government for the same at full prices, and many of whom have expended large sums in developing their properties.

3. The competition that these parties would have in the free import of crude borates would be by foreigners, and generally, if not exclusively, on foreign account. The most formidable foreign rivals would be the deposits in Turkey, India and Chili, owned, controlled and worked by English capitalists. All of these competing sources are worked by manual labor, or labor of the lowest price, and as they would be brought into this country at a low rate of freight it would bring a destructive competition to American labor that develops this, and thereby tends to develop and assist directly or indirectly many other industries. There are great deposits of these minerals in Nevada. Its production employs many men, and many thousands of dollars are annually expended here in working these deposits, and the purchase of provisions, supplies, etc., necessary thereto.

4. The prices of this mineral are now so low as to leave the product unprofitable to some producers, who have been for this reason compelled to quit, while others continue in the business because their capital, plant and machinery are invested therein and they cannot well let go without actual bankruptcy. In short, the business is in that critical condition that a slight injury would wholly destroy it. To allow now the crude material of this mineral substance from Turkey and Chili to come into this country free and compete with the products here, obtained by our high labor, would be to practically confiscate the property of American producers after they have invested large sums therein, and would throw out of employment hundreds of men who are now supporting in comfort themselves and families in this industry.

TWO MINING HERMITS.—Last November two men took a lease of a mine belonging to C. W. Sickler, located on the west side of Little Cottonwood canyon, on Bald mountain, near Alta. They took up a good supply of provisions and went to work with the intention of staying in that elevated place till spring. A few days ago some citizens of Alta missed a familiar tree which stood near the mouth of the mine tunnel, and beside the cabin, and supposing the tree, cabin and men had been swept away by a slide, organized a party and went up to prospect for them. The trip was a difficult one, requiring most of the day, and when within 150 feet of the cabin their progress was stopped by an immense barrier of snow which they could not pass. They saw smoke coming out far above them, and calling to the men were able to converse with them. They could not come to greet their visitors because they dare not trust themselves upon the snow bank hanging on to the side of the mountain, and which was ready to rush to the bottom of the canyon thousands of feet below. They said they were well, had plenty of grub and fuel, lots of ore and did not intend to come out till May. This is one phase of silver mining which the world knows nothing of. Two hardy men imprisoned 9000 feet above sea level, delving in a mine six long, winter months, with no other companions, no news to read or talk about, virtually out of the world so far as its doings are concerned, is an experience few men would like to go through. And this, too, within sight of this busy, bustling city.—*Salt Lake Tribune.*

M'GARAHAN AGAIN.—The House committee on mines and mining has agreed to report favorably the bill to refer the famous M'Garahan claim to the Court of Claims.

Mine Leasing.

The plan of working mines under the leasing system has grown to a remarkable extent in the past few years. Five years ago not a single mine was operated by lessees, while now nearly one-third of the work done in this district is prosecuted under this plan.

The writer recalls distinctly the application of several miners in the spring of 1881, who requested that the advantage of the leasing and tribute system be indorsed by the paper on which he was employed at the time. The requests were complied with and the plan advocated as having proved satisfactory and productive of good results wherever fairly tried.

The plan of letting mines, as practiced under the leasing system now in vogue here, did not meet with general favor at first. Its principal opponents were the various subordinate officials of the incorporated mining companies, who were receiving large pay for doing little or nothing. They foresaw in it the speedy dissolution of the corps of petty officials about each mine, and other features antagonistic to their own interests. Gradually, however, the merits of the plan forced itself upon the attention of these many inexperienced mine managers then in charge of some of the best of Leadville mines. Finally, as mines failed to pay under incompetent management, there remained but one other alternative to the managers besides leasing the mine, which was to resign in disgrace, and they accepted that of leasing.

Considerable money was made in the beginning by lessees, and many a miner resigned his position and accepted terms to work on a percentage some of the old workings or low grade ore bodies, which had failed to prove remunerative under the operations of the company. Repeated and much heralded success induced others to venture into the leasing business, and competition among the miners for desirable pieces of ground became so active that royalties were advanced by the mining companies until scarcely any profit was left for even the most fortunate miner. In old workings where little or no preliminary dead work was required, royalties frequently ranged from 45 to 70 per cent. Leases in those days were generally made for short periods, rarely exceeding six months, and were given to men to clean up old stopes, work out small seams, sort over the filling in underground ribs, and sometimes to work in dangerous ground, which the lessee was required to keep in safe condition, under which provision the companies shielded themselves against damages for accidents.

Gradually much of the best ground in the old mines, which could be worked at a nominal expense, has been exhausted, and the business is not near as profitable now as it was two years ago. Still, a great many good pockets of ore are daily being opened up, and the quantity of ore shipped from this source is surprising.

The leasing of Leadville mines has, however, more recently developed into a far more important industry than the gleaming of old mines and the sorting over of dumps of waste material for fragments of pay ore. During the past six months or a year a number of leases have been let on entirely undeveloped ground. In such instances exploration work had to be commenced at the surface, often necessitating the sinking of shafts hundreds of feet in depth, and the purchase of heavy hoisting and pumping machinery. In such instances the work is generally done by a company of men, frequently composed of miners and men of money. Leases on new properties are made for a much longer period, and at greatly reduced royalties, compared with old and opened mines. The Houghton shaft, for example, is being sunk by a leasing company which has secured the Star of the West claim for a period of five years, with a royalty of 20 per cent. This company has expended over \$12,000 and sunk a shaft 460 feet deep, in addition to driving many feet of levels, but so far has not shipped a pound of ore. A dozen other shafts are being sunk in this district on leased territory, which will have to be put down 300 to 500 feet before striking the vein.

About four-fifths of the business and professional men of Leadville are interested with practical miners in the operation of leases. They generally provide the supplies and implements required, and sometimes attend to the settlements with the company's agents for the ore mined by their associates. Many persons are induced to interest themselves in order to receive some debt made by the miner while out of work, or during sickness or other cause. Others again enter into the business for the speculation and possibilities it presents. It is a comparatively harmless and legitimate way of playing a game of chance, as the surplus money ventured, if lost, is only expended for labor, and after all benefits humanity, while on an average more silver dollars are taken out of the ground than are put into it.

During the past three months few very great results have been attained by lessees, although a large number have returned fair pay. Among the number who have made small fortunes by leasing may be mentioned Lieutenant Governor Preene, Robert B. Estey, John Isard, James V. Dexter, Fred. Beaudry, Will Boshen, Joseph Doyle and Henry E. Wood.

The contracts as drawn up between mine owners or companies and lessees, are generally very explicit and stern in their exactions from the miner, but are rarely strictly enforced. As

a rule the timbering to be done is specified, also the size at which shafts and drifts are to be sunk or driven. Continuous work is demanded, under penalty of forfeiture of the lease, and the minimum number of men to be worked in a given piece of territory. All ore produced by the lessees is shipped under the direction of the owner of the mine, who designates the reduction works, and collects the price of the mineral. He pays the lessees their portion of the receipts, which vary from 40 to 85 per cent of the amount received on the sale of the ore, and out of which the lessees pay their help.—*Leadville Herald-Democrat.*

Gold Fields of Amoor—An Asian California.

A letter from St. Petersburg in the *Journal des Debats* gives an interesting description of the new California, as the new gold mines discovered in the valley of the Djolguits river are called. This valley is upon the Chinese bank of the Amoor, opposite the Russian colony of Tchuachino, and, as the soil is very marshy and there are no roads, it is only accessible in winter. Gold was first discovered there in May, 1884, and it soon attracted a great many adventurers, the earliest comers being Russian deserters and escaped convicts from Siberia, and by the month of January in last year there was a colony of 9,000 Russians, the total having been very much increased since, while there are also about 6,000 Chinese and 150 adventurers of different nationalities, the last named of whom have joined the Russians, the organization of the colony being altogether Russian. The gold-finders are divided into 722 artels (small groups) of workmen, all of whom are absolutely equal. These artels elect twelve elders (starchina), who do not work themselves but superintend the diggings and receive a salary of 200 roubles a month. They are selected from among the dealers in gold and tavern-keepers, and form a sort of district police corps. They do not meet with any interference from the Chinese authorities in this remote valley, the laws of which are very simple but severe, the penalty of death being inflicted for cheating at play, for adulterating the gold dust, or for theft; while flogging is inflicted for drunkenness during the hours of labor or for bringing females into the colony. Since the foundation of the colony there have been only three murders and two indictments of the death penalty, a Russian having been hung for adulterating the gold dust, and a Jew flogged to death for having spread false news as to the approach of a body of Russian troops, hoping thereby to send down the price of gold owing to the panic. There are twenty-seven taverns in the colony, and owing to the competition the prices are not high, except for spirits. The gold fields, which are 25 miles in length by three miles broad, are said to be very rich, and seven pounds of gold are obtained from thirty-two hundred-weight of gravel, even with the primitive mode of washing adopted there.

MANGANESE.—Some little interest is again being shown in manganese mines on this coast. For some years no mining has been done for this mineral substance, the Red Rock deposit in San Francisco bay not having proved profitable to work. Some 80 tons were shipped from here last year, and now some of the ore in small quantities is being taken from the Livermore deposit, Alameda county, and shipped East, the low freight rates permitting this for the present, at least.

CORRESPONDENT AND AGENT.—Prof. J. B. Patch, acting correspondent and business agent for Dewey & Co., San Francisco, and representative of the *MINING AND SCIENTIFIC PRESS*, *Millman and Mechanic*, *Fraternal Record*, *Pacific Rural Press*, *Pacific States Watchman* and *Masonic Record*, for the State of Nevada and Utah Territory, is in town. He is well pleased with Eureka and its surroundings, and believes our resources will yet astonish the world.—*Eureka Sentinel.*

A rich pocket was found recently on Saxon creek, Mariposa county, by a miner who had worked over ten months and realized but thirty dollars in that time. The first day after striking the pocket he took out \$6,000 and subsequently took sixteen pounds of quartz to Mariposa, estimated to be worth \$3,000. The find created considerable excitement and caused many prospectors to take the field.—*Union-Democrat.*

At Nortonville, Contra Costa County, last Saturday, there was an auction sale of real estate. A brick store that cost \$2,500 sold for \$75, a frame store for \$55 and two dwelling houses for \$19. Coal mining regions, evidently "run down" as well as gold and silver camps, occasionally.

ALL the Indian scouts heretofore used in the campaign against the hostiles have been sent back to the reservation. They will be used only as trailers hereafter. This change in the new administration gives great satisfaction in Arizona.

THE Attwood clinometer, illustrated and described in the *PRESS* of March 20th, is manufactured in this city by A. Lietz & Co. of 329 Sansome St.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

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W. B. EWER.....SENIOR EDITOR.

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SAN FRANCISCO:

Saturday Morning, April 24, 1886.

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Passing Events.

The shipment of 21 tons of copper from the French companies' mines in Lower California brings a new copper region to the front. The mineral resources of Lower California have been very slightly developed thus far, but of late several active companies have gone to work. In copper mines particularly, the peninsula is said to be very rich.

The late very wet weather has extended prospecting and mining operations materially. Many miners, with ore on their dumps are unable to haul it over the roads to the custom mills. In many places mills have run short of wood. Of course prospecting cannot be carried on favorably in rain storms.

We devote considerable space this week to a description of the tunneling operations of the Big Bend Tunnel Company, Butte county, the most extensive river bed mining operation ever conducted in this State. The record of work performed will be found of great interest to miners.

There will be an abundance of water for mining operations in California this year; in fact, so far there has been more than was wanted.

PRACTICAL HYDRAULICS.—The concluding article of the series on this subject by P. M. Randall will appear in next week's PRESS.

Flue Dust from Roasting Furnaces.

The amount of flue dust caught per ton of roasted ore depends on character of ore, its fineness, style of furnace and the draught. Those ores give the most fine dust which, before they are roasted, are light and porous and contain oxide of iron. The ores that give the least are hard quartz orss with sulphurates. Those ores which contain a large proportion of sulphurets do not, of course, need to be crushed as fine as those which contain little, the sulphurets being readily attacked by oxygen and chlorine when unprotected by a coating of minerals not affected by these gases. When there is no sulphur present it is necessary to add it as pyrite, hrimstone, or, best of all, as copperas. The ore should then be fine to facilitate the immediate and complete action of the chlorine.

If the reverberatory is properly handled, it produces the least flus dust, for the motion of the ore is less violent than in the others. With care in the reverberatory furnace the amount of flus dust can be limited to two per cent. From the nature of the Stetefeldt furnace a considerable amount of flue dust passes into the dust chambers, but as practically all of it settles there, and, as owing to the auxiliary fire it is chloridized to a higher percentage than the ore itself, this fact is of no importance. As much as 10 per cent sometimes passes over. This is also true of the Howell furnace, though the dust is not so well settled as in the Stetefeldt. The higher chloridation of the dust, than the ore, is very frequently the case. With the Bruckner furnace this amount of flue dust is usually not large, but it sometimes requires a second roasting.

The actual loss of flue dust is very slight with most ores, where the furnace has plenty of dust-chambers and long flues, and it probably does not often exceed one per cent; but when the ore is very finely divided, even under very favorable circumstances, this loss may reach five per cent. Extensive dust-chambers are usually desirable. As regards the loss of gold and silver by volatilization, no reliable data could be obtained by the census officials, who reported on this subject. That there is such a loss cannot be questioned, but at present there is no accurate means of estimating it. Except with ores containing much arsenic, antimony and zinc, it is probable that it never exceeds one per cent.

Mining Accidents.

James C. Riley was killed in the Star of the East mine, about three miles from Butte, M. T., last week, by the breaking of the windlass rope. The splice in the rope "drew."

On Friday last Richard Bellam, employed at the Kentnck mine, Gold Hill, met with a severe and probably fatal accident. He was top car-man and had sent down an empty car on a cage, when, from some unaccountable reason, the cage stopped in the shaft. No one could understand the difficulty, and Belden concluded to go down and find out. He put a piece of scantling across the mouth of the shaft, tied a piece of rope about 75 feet long to it, and deliberately shinned down it to see what was the matter with the cage. In the profound darkness of the shaft he evidently did not know when he arrived at the end of the rope, or was deceived as to the distance, but as near as was calculated, he must have fallen about 35 feet, lodging upon the iron top or honnet of the cage. Upon examination it was found that there was a partial dislocation of the spinal column, in the small of the back, causing paralysis of the lower parts of the body, including the lower extremities.

Wm. J. McDonald had a leg broken, and Thos. Butterworth was killed, last week, in Little Cottonwood, by the premature discharge of a giant powder blast in the Flagstaff tunnel.

JOHN G. KELLOGG, a well-known capitalist of this city, died this week at Sierra Madre, Los Angeles county. The deceased was a member of the assaying and refining firm of Kellogg, Hewston & Co., which, in early days, did the bulk of business in the casting of \$50 slugs. The business in 1866 was sold to the Bank of California and since that time Mr. Kellogg has led a life of privacy.

A PROPOSITION to grant a bonus for the erection of reduction works at Victoria, B. C., has been laid before the city council.

Nevada.

Smith and Reese Valleys—Their Future as Mining Camps—No. 8.

[From Our Special Correspondent, J. B. P.]

Opposite Mr. Hely's ranch, in Smith valley, Lander county, is a well-formed headland mountain some 3000 feet in high. The beautiful samples of ore taken from this mountain, known as Augusta, and the flattering representations made of its mineral character, induced us to make a personal inspection of its merits. The incline tunnel that enters the mountain some 200 feet from its base, is at an angle of some 35 degrees, and shows a vein of great uniformity, increasing in richness of ore quality to the end of the drift, something like 100 feet in extent. We obtained, through the kind offices of Mr. Towle and his intelligent son, quite a number of very rare specimens of natives and wire silver, at the terminal point of the tunnel, where the lode is from twelve to fifteen inches in thickness and heavily charged with metal. We regard this mine, so far as prospecting, as offering one of the strongest inducements of anything we have seen in this State for the further outlay of capital. The abundance of artesian water and the ample supplies of fuel make this a peculiarly desirable point for the planting of mill property, in case the opening of the mine should justify the outlay.

Mr. Williams, a stock man of Smith valley, also has been quite successful in his mining operations at Bernice, and is now making experiments to see if he shall not find sufficient ore to set up a 10-stamp mill of his own at that point. This prudential consideration of securing a sufficiency of good ore in advance of a mill plant, is one that cannot be too strongly commended in mining enterprises of this class. Such a course almost invariably furnishes a guarantee of success and profit in the outcome.

At Austin nothing was doing in this way of milling, and an unnatural season of slackness appeared to envelop the whole camp. Reese river mines, 23 years since, acquired a lofty fame over the whole west for their surpassing richness and profitable working, and much can be done yet here we believe to make this one of the most productive camps of the West. The ores have generally been of a high grade, but limited in quantity in the vein. Several mines that we entered showed this feature, and the jewelry of the mineral offered us as samples in the type of ruby, wire, horn and native silvers were in the highest degree attractive and beautiful to the eye. The discovery of some very fine lodes on the west side of the Reese river by Messrs. Caton & Dundson, indicates the presence of the precious metals on nearly all sides of this great camp.

Mr. Joseph Moss has a very fine mine adjoining the Manhattan, which, with suitable machinery, will work out a bonanza of wealth for both the proprietor and the capitalist. Indeed, what this camp seems mostly to require is more and successfully directed capital to open up the numerous mines, to plant more economical machinery to crush and reduce the ores, and to arouse a healthy state of activity and competition, to the immense advantage of the miner, as well as to the much greater profit of the merchant, citizen and trader. The ore can never be taken from the mines at a profit where the reduction tariff is \$35 per ton, as is now the case here. Where the haton of a single mill sweeps from the surface all surrounding and competitive interests of a kindred character, as in this camp, nothing of a hopeful nature can be looked forward to until a radical change has been wrought, by the introduction of new capital in the form of new mill plants in the hands of men who are willing to live and let live in this great industry of mining, where so much toil and hardship is expended on the part of the independent forces.

Plans are now being effectually laid for carrying out these new improvements, and we confidently expect that the new mining boom now awakening many new and old camps, will sweep in through this thoroughly stagnated interest, bringing forth a resurrection that will in some measure correspond with its brilliant, historic past.

DANIEL GUERNE, a miner well known in California and Nevada, was murdered near La Trinidad, Sonora, Mexico, while on a prospecting trip to the upper waters of the Rio Haves.

The Big Bend Tunnel.

(Continued from Page 273)

would cover the whole time lost by breakage of machinery in the whole three years and four months. The water wheel is supplied from a ditch carrying 100 miners' inches of water taken from Dark canyon. An iron pipe of 11-inch diameter conveys the water to the wheel, the vertical fall being 275 feet.

Through the courtesy of Mr. N. A. Harris, the superintendent of the company, we are enabled to give this following record of this work in the tunnel:

Record of Work.

The size of the tunnel is 9 by 16 feet.

Distance by hand to	Feet.
Nov. 18, 1882.....	26
" drills Nov. 18th to Dec. 31, 1882.....	373
" Jan. 1, 1883 to Jan. 1, 1884.....	3,503
" " " 1884 " " 1885.....	3,000
" " " 1885 " " 1886.....	3,855
" " " 1886 " April 12, 1886.....	1,155

True length of tunnel.....12,002

In 1883, 18 shifts of eight hours each, or six days' time was lost; in 1884, 14 shifts of eight hours or 4½ days' time was lost; in 1885, 16 shifts or 5½ days' time was lost.

Least distance made in	Feet.
Aug. 1883.....	175
Greatest distance made in Sept. 1885.....	405
Average progress per month in 1883.....	291.9
" " " 1884.....	257.5
" " " 1885.....	321.25
" " " 1886, 8 mths. 12 ds. 330.7	
" " " from Dec. 1 1882 to Apr. 12, 1886.....	301.92

There has been used 154,815 pounds of No. 1 Giant powder; 16,535 pounds of No. 2 Giant powder; 94,669 drill points.

There has been drilled 38,085 drill holes of a depth of 215,949 feet or an average depth of 5.67 feet.

There has been moved 116,167 cars of rock from this tunnel.

There has been used as fuel for engines about 5500 cords four-foot wood.

Distance made from December 1, 1882, to April 12, 1886, 11,898 feet, made by 3605 shifts of eight hours each or an average of 3 3-10 feet per shift. Average time of drilling a round of holes for the period from January 11, 1883, to April 12, 1886, is 2 hours, 54 minutes.

Drilling Operations.

In drilling the holes in the face of the tunnel, 12 holes were generally made in four horizontal rows of three holes each. Sometimes in the hardest rock 24 holes were made. The two vertical center rows of holes were bored at converging angles so as to form a V-shape. This center set of six holes or "cut" was blasted first, and from the first blast from 17 to 20 carts of dirt were usually taken. In the granite there were eight "cut" holes blasted. This would leave six to eight holes on the sides which would be next blasted. In starting the holes the superintendent would suspend two lines or cords carrying plummets from the roof so the plummets would be in the center. These were only put in every few weeks, and were shifted when necessary. Then by sighting along the ends of these cords, which were 30 or 40 feet back from the face, the shift boss could get the exact center of the face.

The holes were all drilled about six feet in depth and were started with a 2½-inch drill. Water was used in all the holes, the stream being forced through a one-sixteenth hole in the nozzle.

Mr. Cribbins, the foreman, attributes much of the credit of the rapid work to the use of the drill carriage, which is much more convenient than columns for the drill. This carriage which was 8 feet 8 inches wide carried four drills, and there were two men to each drill. They would first drill the center or "cut" holes and then pull the arm out close to the side of the tunnel, for the side holes. With a column they could not get so close to the side for there needs to be room for the machine on the side of the column, and room to swing it, etc. In using the carriage all four drills can be run back to blast in the time it would take to remove one column drill.

Another thing for facilitating the work was the "platform." This was made of single planks five feet long, twelve inches wide and two and one-half inches thick. These were covered with half-inch iron, spiked on and the spikes clenched. When these planks were laid they formed a solid shoveling platform 25 to 30 feet back from the face, on the floor of the tunnel. After the blast the men could shovel up all the debris from this platform very quickly, and it made a big difference in hand-

ling the material. Mr. Cribbins states that on several occasions when the platform was not used, he found it took about two or three hours more for the shift to remove the 45 to 60 cars of rock thrown down by the blast.

In driving the tunnel each of the three shifts is made up of a boss, four drill men, four helpers on drills, one powder man, one car man and two laborers. The outside force consists of two blacksmiths, two helpers, one machinist, two engineers, and a number of other laborers varying with the requirements of the work. About 70 men were worked, on an average, outside ones and all. Mr. Harris states that they had the best crew of men he ever saw, steady and good workers, a large number of whom have been at work since the company began operations.

The grade being uniformly down, the removal of the rock is not difficult. The movement of the cars is effected entirely by means of mules, six animals being kept at the tunnel for this purpose. The trains are composed of from ten to twelve cars, and the number of daily trips is regulated entirely by circumstances. They started in with two mules and increased the number to six. These are all living and working now, there never having been any accident to them or with them.

Giant Powder.

Considerably less powder was used in this tunnel than was at first expected. Still, during the whole work, they used, as stated, 154,815 pounds of No. 1 and 16,535 pounds of No. 2—171,340 pounds in all. In some places it took six cartridges of No. 1 giant to each hole; in other places good work was done with two cartridges. The cartridges were 1½ inches in diameter. They had very little trouble from fumes. The compressed air hose came to within 25 or 30 feet of the face. As soon as a blast was made the air hose was unopened and a full supply of air forced in. At the same time the exhaust blower at the mouth was set in motion rapidly and the foul air sucked out through the large pipe. They tried thinning down the fumes with spray, but the men complained that this was all right for a few minutes, though when they began to shovel it seemed that the fumes rose again. They found that forcing plenty of fresh air in and exhausting the gas, smoke and bad air, worked much better.

Character of Rock.

This record shows extraordinary good work in drilling. The character of the rock changed during the progress of the tunnel, and therefore the results of the different months are not strictly comparable with each other. During the first nine months an easily penetrated slate formation, with occasional stringers of quartz and granite, prevailed, with the exception of about 200 feet of very hard diorite. For several months after this, the rock continued hard and difficult to work; but when the tunnel had been driven about 6000 feet, or just half the distance, a black slate was encountered, which, though close and hard, and requiring a large amount of explosives to blast it, permitted excellent speed with the drills. The rock changed often into very hard rock, from the slate and then back into slate again. There were only five places in the whole tunnel which have to be secured by masonry work. At these places the top is to be roofed with timber or iron, and the sides and bottom cemented. No trouble whatever was experienced in the ventilation. The blower at the mouth of the tunnel was used as an exhaust and the air supplied to the drills gave all the fresh air at the face. The temperature has not varied much from 60° F. all the way through.

Ventilation.

The blower is driven by means of a separate engine. It connects with an 11-inch iron pipe, which extends up the tunnel to within 200 feet of the working face. The blower is used exclusively as an exhaust for extracting the smoke and had air from the heading. It is only put in operation 10 or 15 minutes before a blast, and at the same time the air compressor delivers a volume of fresh air directly into the face of the tunnel. This arrangement permits the men to resume work within about 15 minutes after blasting. Both blower and compressor are kept at work until the debris has been removed and the drilling recommenced, when the blower is shut down until just before another blast. A track of two-foot gauge, laid

with 16-pound T-rail, extends from the heading.

No Saloons and No Accidents.

They have been very fortunate in not having any accidents. Not a single man was killed during the progress of the work in the tunnel. There are no saloons within several miles of the tunnel mouth, which is perhaps one reason why the company have been so successful. They secured plenty of ground for their boarding houses, etc., and in addition to buying right of way above and below the tunnel, they also purchased ground to prevent the establishment

prospected much as yet, though it is thought they will pay to mine. There is plenty of dump room on the canyon.

As stated, the tunnel is 12,002 feet long. It was run at a 30 foot grade, except the last 200 feet, where an extra grade is put. Although cut 9 by 16 feet, it will really be 10 by 16 feet, for about a foot of the floor has not been removed, but will wash out when the water is turned on. The entrance of the tunnel is widened out to 32 feet—double width—to give the water a good start. It is estimated that it will take 105,000 miners' inches

by turning the water through the tunnel, the work will be carried on the same as any ordinary river-bed mining. The gravel and sand will be washed in sluices. Water comes in from several side streams, so there is an abundance of that. Several different portions will be worked at the same time, as they cannot work a large body of men in any one place. They will work from 50 to 100 men in a place, and work at least four or five places at the same time, if the river can be worked to advantage. Of course, this is not a hydraulic mine, and nothing is to be put into the river, so there is no danger of legal complication. The fall of the river is such that there is no more debris there now than there was 30 years ago. The gravel on the bedrock is not more than four or six feet deep, and the width of the bed is from 100 to 200 feet. In some places there are many large boulders, but the Giant Powder soon gets the better of that difficulty.

On account of the steep and rocky banks, it has been impossible to wing-dam or flume this part of the river, except in a few places, and at these places it has been worked, though a very small proportion of the river was mined. They worked enough, however, to know that it is rich in places. The river above and below the Bend has proved rich in gold, but this portion it was only possible to work in a few parts. A tunnel such as the one described was the only means by which the water could be turned and the river bed mined.

River Bed Mining.

It is scarcely necessary to call to mind to California miners the rich diggings of the Feather river in the early days. The famous old Cape claim, below Big Bend, yielded \$680,000, in 42 working days, from 3300 lineal feet of river bed. The river channel, both above and below the Bend, has proven itself rich, so the company naturally expect very handsome returns when they lay bare 14 miles of river bed, which, before this enterprise, the miners could not touch. It is curious that the project was not carried out long since, as there has been no question of the richness of the bed of this river. There is, of course, a possibility of finding another "Cape," in which case the whole expense of the enterprise could be paid at once.

Of course, like any mining operation, "chances" have to be taken; but it seems scarcely probable that a river so rich as this has been above and below would be barren in a stretch of 14 miles, especially as this has been a natural sluice for hundreds of years, and there must be more or less gold buried in the beds of sand, gravel or boulders, or packed in the crevices and pockets of the bedrock. How much or how little there is of course cannot be determined until the water is out of the river, and the bed is worked. Yet it seems reasonable to suppose that the company will be paid for all its outlay, and a very handsome profit in addition.

The President, Superintendent and Foreman.

The carrying out of this enterprise is mainly due to the efforts of Dr. R. V. Pierce, of Buffalo, N. Y., the president and largest stockholder. He has always had entire confidence in the success of the undertaking. At the time of his visit to this city last year in conversation with him he assured the writer that he was even more confident of success than when he commenced. Although many tried to "throw cold water" on his ardor, he never faltered in his efforts to push the work, or in his outlay of money. He has put hundreds of thousands of dollars into the enterprise, with, of course, no possible chance of getting a cent back until the whole work was completed. It would be a good thing for the State if we could import a few more men of this enterprising character.

The superintendent, N. A. Harris, is highly spoken of by the president of the company, and in fact by all who know him. He is active, energetic and experienced, and has conducted the work with marked ability. After the preliminary surveys, in which he assisted, the superintendent did all the engineering work without the assistance of outside engineers, and attended to the many and various details in conducting the whole enterprise.

The foreman, Mr. John Cribbins, is a man of excellent character, thoroughly understands his work, and, what is more, thoroughly understands men. He has had large experience. The drilling work has been carried on by him in a most satisfactory manner, as the results show.

The resident secretary is Mr. Ed. Harkness, who has been with the company since it started in that position, which he has filled to the satisfaction of the company, and the employees as well.

The engravings which we use herewith were made by the *Scientific American* mainly from drawings by Chris. Jorgensen of this city. Figure 1 shows the entrance to the tunnel. Fig. 2, hoarding houses and plant in Dark Canyon. Fig. 3, drill carriage in tunnel. Fig. 4, air compressors for supplying air to drills. Fig. 5, map of Big Bend, the tunnel line, and section of tunnel. Fig. 6 is a view of Island Bar in the Big Bend (Feather) river. From this bar considerable gold has been taken, wing dams being used, but it has only been partly worked.



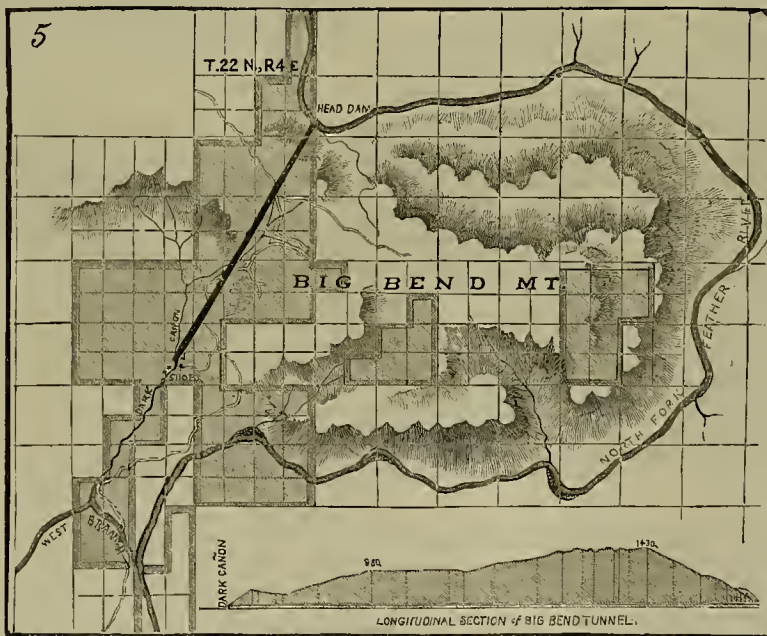
VIEW OF ISLAND BAR, FEATHER RIVER.

of drinking saloons. At the start the company adopted a rule that any man coming about the works intoxicated would be discharged. A few examples served to show that the superintendent was in earnest and no further trouble was experienced. The company bought also

of water to fill the tunnel; and if the head is increased there will be an increase of capacity.

The Dams.

As soon as the river is low enough, a temporary crib dam will be put on, which will probably not be until the last of June. Six heavy



MAP SHOWING TUNNEL AND BIG BEND OF FEATHER RIVER.

gether several thousand acres of land to cover the tunnel site, timber land, etc.

Roads and Trails.

A great deal of work has been done on the surface. Roads have been built so as to get in supplies from Oroville, and a saw mill was constructed near the mouth of the tunnel to furnish timbers. Some 14 miles of pack trail was built around the bend, and this alone cost \$6500, which shows that the canyon is a rough and steep one. The canyon is narrow and its sides precipitous. A telephone here has been built to Oroville, and one will shortly be put in around the bend also.

In winter water has been available for power; in summer steam has been used, though occasionally both have been brought into service.

While running the tunnel some quartz ledges carrying gold were found. They have not been

gates, made of iron and steel and 4½ feet by 8 feet in the clear, are being made at the Risdon Iron Works in this city, for the mouth of the tunnel. These may be closed or opened by screws and wheels. When the crib dam turns the water into the tunnel, a permanent dam 125 feet long and 16 feet high will be built. The river is narrow just at this place. It is 175 feet just above where the crib dam is put in. The slopes of the new dam will be three to one on the upper side and two to one on the lower side. The water rises 50 feet in the river at this point in extreme flows. The tunnel will be able to carry off the river flow for from seven to nine months of the year. When the river gets high, the tunnel will be closed by the gates and the water will then flow in its natural channel.

Working the River Bed.

In working the river bed after it is drained,

MECHANICAL PROGRESS.

Crude Rock Oil for Keeping Steam Boilers Clean.

A correspondent of the *Scientific American* writes as follows: Crude rock oil properly used will keep a clean boiler. With any kind of water within reasonable fitness for use, it will keep it in excellent condition, and free from scale or moving sediment; but the crude rock oil will not do all this unless the proper amount of blowing off be done, for it will not compass the neglect of attendants. The proper way to use the crude oil is to send it into the boiler through this feed water, only once a day, and only in very small quantities. One-half an ounce per day will keep an ordinary tubular boiler of fifty horse-power as clean as possible; and after a few months of regular use the shell will be found as smooth as a piece of jappanned work, provided it was not pitted at the start, and the tubes will be perfectly clean and smooth. The oil must be introduced into hot water, and for some reason it does its work better under pressure. If any "constant feeding" of this oil into a boiler takes place, the fire seams will commence to leak, for this has been tried; there seems to be a call for only a small amount of the oil, and the small amount must not be exceeded.

Parties who have used this "crude oil" for four to six years have in some cases experimented with the amount, and in every case an excess of oil caused a leaking at the seams, while a small amount produced the most complete cleanliness and immunity from scale. In a large plant under the advisory charge of the writer, the use of the "crude oil" has proved that it would loosen the scale rapidly; and in the case of an upright boiler, worked under one hundred pounds pressure, the scale became so rapidly freed from its hold on the tubes and firebox sides that a stop became necessary to clear out the leg of the boiler, and over five inches in depth of loosened scale was found in the water leg. In fourteen weeks another instalment came out, and the coal consumed fell from 4,800 pounds to 3,200 pounds in the same time, the work done by the boiler being increased.

Some amusing instances might be related of putting in "a gallon of oil" at the cleaning of a boiler, on the supposition "it would last," or of using tallow or sperm oil, or of some departure from the "crude rock oil," with a bare escape from serious consequences in two cases, and of "leaky boilers" in others.

"Crude rock oil" can be used in any boiler to advantage, on the same principle as exemplified in the housewife's dinner pot—the oil or grease coats the surface of cast or wrought-iron, and the pot becomes smoother than those not used for boiling greasy meats; but the steam boiler, under pressure, and at a very much higher temperature, with a small amount of oil in motion through the circulation, becomes glazed, and being kept so by the minute particles of oil deposited, offers no chance for the scale to lay hold or to maintain a hold if one be acquired.

Many trials of crude oil in this way have been made in the New England States, especially in the large powers of cotton mills and manufacturing concerns, and its use is extending.

Cleaning up Machinery.

A cotemporary gives the following good advice in regard to keeping machinery clean:

In cleaning up a piece of machinery to keep it in the best working order, some attention should be given to those parts which are out of sight, that generally have the most of the work to do, as well as to be continually shining up the finished work to satisfy the general appearance. Superficial cleaning is all very well as far as it goes, provided that the dirt and dust which settles and collects on the machine is not wiped out in every corner, and all the spacings between the wearing surface filled with the polishing powder from the wiping waste. Many of the vital parts of a machine have had to be removed long before the general overhauling that is instituted to look after the condition of things that are not benefited from any superficial treatment. No machine can be kept up to the highest speed or left at its greatest working capacity, if all the parts where the greatest strains are brought, or the hearings that have the most of the load to carry, are to be neglected. Among the machines of the same class, or the machines of one mill over another, the difference in production is owing as much to the lubrication, and the oil that is used, together with its treatment, as with the builders of the machinery. Besides, a thorough cleaning, that would relieve every lubricated surface of its load of impurities, would seriously hinder the adjustment of a machine, if the bearings are to be disturbed and screw-bolts and check-nuts are to be meddled with to remove the grit that has collected behind a collar or under the shoulder of a journal. The success in the free use of oil, or where the lubricant, however cheap, is thrown all over the machine, is owing more to the continued bathing, that is, washing out the very collection of the grit grinding products that have been working into the machine. A mixture of cheap oil with a little of the very best, must bring a cheap journal in contact with a large amount of decent lubrication where such a circulation

is kept up, though it may not be enough to neutralize the effect of the waste matter the cheap oil may contain. No doubt, where drainage is good, or the drip from the machinery can be easily disposed of, that the slushing method, without regard to general appearance, has proved more beneficial to the life of a machine where the highest speed is to be maintained, but certainly, as a rule, the proper cleaning of machinery has not received that care or attention, nor are they provided with the requisite means of lubrication which sincere regard for economy demands.

Preventing Boiler Scale.

Boiler incrustation has been a subject of much discussion, and the list of methods thus far proposed to offer relief from its annoying and dangerous presence is of considerable length. With but few exceptions, however, their chief claim to attention is to be found in their novelty alone, and the results of their practical application would often prove more surprising than agreeable. This is particularly true of a method to which of late a good deal of currency has been given, and for which it seems German ingenuity is responsible. It recommends that "the feed water should be forced through one of the usual feed contrivances into the steam dome, in which it is mixed by a jet of steam entering concentrically, in order that it may, during the mixing, be cast violently against the cover of the dome. The effect of this movement is that all the water receives the full temperature of the surrounding steam. By this sudden heating, air and carbonic acid are withdrawn from the water, and not only the carbonate of lime but the sulphate of lime and magnesium are extracted and the precipitate occasioned is periodically removed." Whether or no this plan has ever been tried we are not informed. Whatever its effect would be as a means of preventing the formation of troublesome deposit, there can be no question as to its influence as a method of feeding simply. The dome of a boiler is certainly not the proper place into which to direct the water supply, and a test of the method would speedily furnish proof of the desirability of abandoning it. The item is worthy of attention specially because of its tendency to belittle the importance of properly locating the feed-pipe and to encourage the sacrifice of good practice in that respect for something which can be obtained to a reasonably satisfactory extent by already well-known methods.

FIFTH WHEEL FOR VEHICLES.—A device for this purpose, which is simple in construction, durable, and at the same time cheaper than the ordinary fifth wheels at present in use, was patented by Messrs. Pinckney & Terry, of Valdosta, Ga. It consists of a circle or guide having annular grooves on its inner and outer peripheries, the interior one receiving the center or circular portion of the fifth wheel to which the bolster is secured, and the exterior one receiving the curved reach, which extends around it and furnishes the means both for coupling the fore and hinder parts of the running gear, and permitting them to turn independently of each other. This construction enables the inventors to dispense entirely with the king bolt. The fifth wheel is fastened to the front axle by means of bolts which pass through the circle, leaving the center free to work in the inner groove. Among the advantages of this device are the following: There are no king bolts to become broken. The upright pieces that receive the bolster are many times stronger than a king bolt without a reach. The reach is made of iron rod of suitable size, and is strong and perfectly reliable in use. The running gear can be manufactured at one-half the usual expense. The two uprights have threads at the ends for nuts. A piece of iron with two holes fits over the bolster and the arms and is secured by nuts. No dust or dirt can enter the parts, and consequently there is very little wear.

COMPARATIVE ECONOMY OF EXHAUST AND DRY STEAM.—Supt. Manning, of the Amoskeag Company, Manchester, N. H., says, in a note relating to the comparative economy of exhaust and dry steam for heating: "On our lower level, where we always use a large amount of steam for dyeing and drying, in case of low water, I can run our 36 inch x 6 foot Corliss up to a thousand-horse power without any change in the boiler except a slight increase of pressure and whatever increase of fuel there is (of course there must be some) is so small that it falls within the daily variation due to other causes."

A FIRE BANKED FOR SIXTEEN MONTHS.—One of the blast furnaces of the Kemble Iron and Coal Company, at Riddlesburg, Pa., was banked up in November, 1884. After being out of blast nearly 16 months, it was recently opened for the first time, and the fire found still burning. The coke glowed brightly, and on the admission of the blast soon became hot enough to melt cinder. The furnace was started with as little difficulty as if it had only been standing a week.

A LOCOMOTIVE THAT HAS RUN THIRTY YEARS.—The old locomotive "Muckalee" on the Southwestern Railroad of Georgia will be finally retired when the change of gauge occurs, not being considered worth the necessary alterations. This engine was first put on the Southwestern road in 1856.

SCIENTIFIC PROGRESS.

The Varied Mysteries of the Heavens.

It is well known to all who have paid the least attention to the study of astronomy that our sun, with its solar system, in addition to all their other varied motions, are moving at the rate of 160,000,000 of miles a year, in what appears to be a direct motion towards the constellation Hercules. The region of space toward which this movement is tending is exceedingly rich in stars of peculiar brilliancy and many colors—the most of them are much greater than our sun. Besides the great constellation named we are also approaching that of Orion, with its galaxy of green suns. This cluster appears to be a golden cloud of stars clinging together like a swarm of bees, and yet separated from each other by billions of miles of space. Within the boundaries of this cluster there is also one of the most brilliant nebulae which adorn the heavens—"the nebula in Orion"—which may be distinctly seen by a telescope of the very smallest power.

We frequently speak of our sun moving towards a certain point; but we seldom reflect that while we are moving towards a certain point or a certain star, that star is also moving with great rapidity—it may be away from us, it may be towards us, it may be to the right or left at a greater or less angle, so that when we reach the point designated the star we are now approaching will be as far away from us as ever. Astronomers tell us that some stars are rushing from us while others are rushing toward us with almost incredible velocity.

Instruments have been constructed which can tell with absolute certainty whether we are approaching or receding from any given star. The stars we call "fixed" are so only because their immense distance from us renders their motion imperceptible except to the most delicate instruments of astronomical measurement. Every star in the universe has various motions of revolutions on its axis, revolution around other stars and still greater movements of which we can form but a dim idea. The whole universe is in motion of the most inconceivably rapid character. The stars and suns are moving in every and all directions, but all, no doubt, in circles more or less elliptic. Nothing moves in a direct line; curve is beauty, motion is life; a halt would be death and destruction.

New stars are constantly appearing and others are disappearing—that is to our vision. No star, however, is lost. The economy of nature is perfect. The appearing and disappearing of stars is no doubt due simply to their greater or less luminosity. It requires a luminosity of the greatest brilliancy to traverse the inconceivable distances of inter-stellar space. A star which might be very bright at a certain distance would be invisible at a greater distance.

A new star has recently made its appearance in the constellation Orion, of which we have been speaking. This star presents some new and interesting characteristics which are being carefully studied by astronomers. M. Wolf says this star is similar to one of the most marvellous stars in the heavens—Misi Celi of the Whale. It is supposed to be a variable star, which becomes visible and invisible by the increase or decrease of its conflagration. The number of variable stars is very great.

But the most wonderful and incomprehensible of all the mysteries of the heavens is its vastness—its utter illimitability. Should our sun or any other sun commence moving in a direct line at the rate of a thousand millions of miles a year, at the end of myriads of years it would be no nearer to the limits of the universe than when its motion first began. Also the number of worlds in space. Let the tiniest drop of water represent a sun, then count the number of such drops contained in all the oceans and seas of the world, and their number would but just begin to represent the number of worlds in space. Nothing but an infinite mind can comprehend an infinite space.

Among the other wonders now to be seen in the heavens are three comets, which at present can be seen only by aid of the telescope. Two of these will soon become visible in the same immediate neighborhood in the northwestern heavens. The third is about disappearing from even a telescopic vision. Of wonders in the heavens, as well as upon the earth, there is no end.

ARTIFICIAL COCAINE.—One of the great drawbacks to the more general use of this important drug is its great cost. Recently, however, Mr. W. Merck has announced the artificial formation of cocaine, which is probably the first step toward cheapening the production of this alkaloid. He tells us that cocaine may be prepared by heating benzoylecgonine, with a slight excess of methyl iodide and an equal volume of methyl alcohol, in a sealed tube at 100 degrees C. This is not, exactly speaking, an artificial formation of cocaine, but the conversion into this base of another substance contained in the coca leaves, which has hitherto been a by-product of little or no value. Another chemist, Z. H. Skraup, has confirmed Merck's observation just alluded to. He also shows benzoylecgonine to be a by-product in the preparation of cocaine. It crystallizes in transparent prisms. The acetate and sulphate also crystallize in prisms. By the action of hydrochloric acid in sealed tubes, at 100 degrees

C., it is decomposed into methyl chloride, benzoic acid, and ecgonine. This author also says that benzoylecgonine is converted into cocaine by the action of methyl iodide in the manner described above.

Origin of the "Bad Lands."

That part of the great treeless plains of Dakota, familiarly known as the "bad lands," are said to owe their origin to the burning of the coal deposits that once existed there. They are situated principally along the Cheyenne and Grand rivers and the Little Missouri. They are from two or three miles to, say, twenty-five miles in width. In the long ago, the valleys of these streams must have been filled with drift wood. Then followed a period of drift, which buried the accumulation of wood under two or three hundred feet of sediment, sand and gravel. The hurried wood in time, became coal, the veins being in some instances twenty odd feet in depth. Either from spontaneous combustion or from electricity, fires were started in these veins, and they gradually burned out, restoring in part the old water courses by means of the overflow from the accumulation of water in these newly formed basins. Looking upon them, here you see patches of slag, there, great boulders, showing unmistakable evidences of great heat, and on every hand scoria or burned clay resembling broken brick. Where the fires were checked by the caving earth and the coal did not burn, mounds two or three hundred feet in height stand. And according to the *Black Diamond*, a newspaper devoted to the coal interests, published in Chicago, in parts of Wyoming the same process is now going on; vast fields are undermined by subterranean fires, and the blackened, smoking plain is filled with desolation. Trappers say these fires have been in existence for a long time, and the traditions of the Indians point to the same conclusion.

NOT A NEW DISCOVERY.—The origin of natural gas is not so recent as many imagine. In the diary of an old gentleman named Wicksham, it is related that in 1831, when Barcelona, on Lake Erie, was a port of considerable importance, the light-house lamps at that place were fed with natural gas taken from a spring three quarters of a mile away. This spring was in a marshy place, several acres in extent, and the water overspreading, it was constantly bubbling with gas. When the bubbles broke into the atmosphere they would flash if a light was held near. A tower 20 feet across was built over the spot where the bubbles broke in greatest number, and from this rude reservoir or gasometer the gas was conveyed in wooden pipes to the light-house, which was 50 feet in height. Enough gas was collected during the day to supply the burner of the light-house during the night. From wells since drilled Westfield is supplied with gas sufficient for illuminating purposes, but not in quantity adequate for fuel.

GLYCERINE OUT OF DISTILLERY DREGS.—"We are getting an excellent article of glycerine out of distillery dregs now," said a manufacturing chemist, "and as soon as the fact gets to be generally known the refuse of this worm of the still will be worth more than it ever was before. Glycerine is a constant product of the alcoholic fermentation of saccharine matter, and all fermented drinks contain quantities of it. In the distillation of liquids containing alcohol the glycerine does not free itself from the 'mother,' or dregs, not being volatile like the alcohol. The glycerine is taken from the mother liquor by the ordinary chemical methods, and super heated steam is then brought to act in the residuum, which removes the impurities and leaves a choice quality of glycerine. The dregs are used very extensively in the manufacture of glycerine in France, but they have not come into much use in this country as yet."

HOW FAR SOUNDS CAN BE HEARD.—A train of cars is plainly heard on the line of the Atlantic & Pacific Railroad at The Needles for a distance of 78 miles to a place called Cottonwood Island. The discharge of the sunrise gun at Fort Mohave can be plainly heard at Colorado canyon, a distance of 100 miles. Sounds can be understood in the narrows of the Grand canyon of the Colorado for a distance of 18 miles; or, in other words, if a man in one end shouts "Boh!" the man at the other end can plainly hear the echo. The whistle of a Colorado steamer can be heard from El Dorado canyon to Weaver ville, the bead of navigation, a distance of 78 miles, and if somebody tumbles a rock over the precipice at Lee's Ferry you can plainly hear the echo down the river at Weaver ville, a distance of 36 miles.—*Yuma (Arizona) Sentinel*.

FLOW OF WATER THROUGH A LEAD PIPE.—Some experiments have been made by Mr. G. Sacheri to test the flow of water through a lead pipe. The length was 3419 feet; the gradient for a length of 102 feet was 1 in 10.5, and for the remaining distance 1 in 142.86. The pipe was quite new, and of a diameter of 25 millimeters (0.984). The head of water was 29.2 feet, and the discharge was found to be 0.02036 cubic feet per second, giving a mean velocity of 2.335 feet per second. The high rate of discharge is attributed to the good surface of the new pipe.

ENGINEERING NOTES.

Harbor Facilities.

The national Government is spending vast sums annually in improving harbors and rivers throughout the Union. This expenditure is based upon the theory that it is the duty of Congress to see that every reasonable facility is afforded by the national Government to secure good facilities for shipping at all our principal seaports and through all our most important navigable rivers. There are very few who dispute the propriety and correctness of this proposition. The Legislatures of many of the States have repeatedly taken action in this matter by adopting resolutions instructing their representatives in Congress to urge appropriations having this end in view.

While large sums have been expended in other sections of the Union for such purposes California has been decidedly neglected especially so far as the harbor of this city and the rivers flowing into it are concerned. A movement has recently been put, however, which it is confidently expected will result in securing something like a reasonable attention being given to the wants of this coast and our almost only navigable stream.

The section inserted in the river and harbor bill, instructing the Secretary of War to commence legal proceedings to prevent the further deposit of hydraulic mining debris into the Sacramento river, places at the disposal of the War Department sufficient funds to make the declaration effective.

New York harbor appears to be the great vortex in which most of the appropriations are mostly swallowed up. That city has become the great entrepot for most of the commerce finding its way to this country, and through that city also the most of our exports find exit. Nearly every section of the Union is interested in securing the cheapest and freest possible transit through that city of merchandise, either in coming to or going from the country. Whatever these expenses are, they are all averaged upon the consumers and sellers. The tax which is thus paid to New York is not less than \$25,000,000 annually. In addition to this, there is also a heavy expense incurred after the goods have reached terminal points upon opposite shores. Some idea of this enormous expense thus incurred may be inferred by inquiring into the cost of the machinery and means for this short transit.

One railroad line owns 22 tugs, 38 floats and 46 lighters and barges, used for no other purpose than bringing the merchandise from the railroad terminus to the city itself. Another railroad line owns 8 tugs, 19 floats, 46 lighters and barges, a steam lighter and a largesteamer, all constantly engaged for the same purpose. The aggregate cost of these auxiliaries is estimated at over \$600,000 per annum, which, at four per cent, represents the interest on the capital of \$15,000,000.

The necessity for the best harbor facilities are equally important. Great complaint has recently been made of the shoaling of the New York harbor channels by the dumpage into the bay of offal from the street sweepings. Careful examination, however, seems to show that such is not the case—that no evidence of any city dumping has been found in many of the channels examined. In fact it is shown by competent authority that there has been no shoaling of channels during the past ten or fifteen years at least. On the contrary, the facts brought out show that the channels have actually increased in depth.

The trouble seems to be that the draught of vessels has been gradually increasing until the danger point has been fully reached and now Congress is being urgently importuned to deepen the channels to meet the demand for deeper water. How far Congress should go in this direction may be a matter for honest disagreement. The constant depth asked for is thirty feet, which would seem to be not an unreasonable request. Special efforts are now being made to secure firm and united action to this end, in which nearly the whole people of the country are interested.

At a late meeting of the Chamber of Commerce of New York a memorial was received from the agents of all the steamship companies doing business in that city calling attention to the importance of improving the facilities for navigation in that harbor. A series of resolutions were offered by Mr. Stephen W. Carey, a large ship owner, alluding to this memorial and asserting that serious delay and danger, and not infrequent pecuniary loss, was incurred by reason of the shallowness of the entrance to the harbor; that commerce was thereby greatly embarrassed and threatened with effects deteriorating to the future welfare of that city. Attention was also called to the acknowledged proof that the channels might be deepened at reasonable expense and that the natural scourings of the tides would maintain the desired depth perpetually after it was once properly secured. The resolutions declared that Congress should be asked to begin work of improvement at once.

NATHAN APPLETON says of the Panama Canal, which he visited with De Lesseps: "M. De Lesseps has made up his mind on one matter from personal inspection, which is of great importance, and that is that no tidal barrier will be needed at the Pacific terminus of the canal. These views of De Lesseps mean an economy of several tons of millions of francs."

USEFUL INFORMATION.

Colored Photographs on Glass.

The exceedingly delicate colored photographs on glass, says an engineering paper, which have come into fashion somewhat of late, are produced by fixing a paper photograph upon a cushion shaped glass with transparent cement, and when it is dry rubbing away two-thirds of the thickness of the photograph with sand-paper. The thin film left is then rendered transparent by soaking in melted paraffin wax, after which transparent colors are applied, which appear softened down when looked at from the front. The background and heavier portions of the picture are then painted in body color upon the face of another cushion-shaped piece of glass, which is afterwards fixed behind the first one.

An improvement in this process has recently been made by Mrs. Nelson Decker, daughter of the late C. F. Varley, F. R. S., and the first of the young members of his family to have produced a scientific novelty. She has just discovered that the second sheet of glass may be abolished, a better artistic effect produced, and the picture rendered more permanent by being protected from the action of the air and deleterious gases by being wholly embedded in paraffin. She does this by quickly dipping the photograph in paraffin a second time after the transparent colors have been applied, and painting the heavier colors upon the back of this second coat. A third layer of paraffin is then applied, and the background painted upon that; the third coat may be finally protected by yet another layer of paraffin. Some practice is necessary to acquire the knack of doing this efficiently. It must be done quickly enough not to remelt previous layers, and the plate must, after each dipping, be quickly tilted on end in such a manner that the paraffin does not run into ridges and thickened lines, but forms an even coating.

REMOVING OIL, ETC., BY INFUSORIAL EARTH. Scouring or removing oil from substances such as wool and woolen cloth, by means of infusorial earth, has been patented by Groth. This kind of earth is one that absorbs a great quantity of liquid, and is what is used to absorb nitroglycerine and make it into dynamite. The patentee states that it is this extraordinary power of taking up liquids which enables it to withdraw oil from textiles containing it. The process is to warm the textile with the infusorial earth in some apparatus where the temperature may exceed by 10 or 20 degrees the melting point of the oil or grease. As soon as it is liquefied the infusorial earth takes it up from the textile. After this the materials are passed through warm water, which washes off the infusorial earth, leaving the fiber clean. If instead of infusorial earth we read fullers' earth, the principle of the process will be found very ancient.

THE BONE INDUSTRY of the country is an important one. The four feet of an ox will make a pint of neat's-foot oil. Not a bone of any animal is thrown away. Many cattle's shin bones are shipped to England for the making of knife-handles, where they bring \$40 per ton. The thigh-bones are the most valuable, being worth \$50 per ton for cutting into toothbrush handles. The foreleg bones are worth \$30 per ton, and are made into collar buttons, parasol handles and jewelry, though sheep's legs are the staple parasol handles. The water in which the bones are boiled are reduced to glue, and the dust which comes from sawing the bones is fed to cattle and poultry.

WHEN WATER BOILS.—Water does not boil until the tension of the vapor formed by heating it is greater than the atmosphere's pressure. At the sea level, where the pressure of the atmosphere is about 15 pounds per square inch, the water must be heated to 212° before its vapor has sufficient tension to overcome this pressure. At Argenta, Montana, where it is so much above the sea, having a much less depth of atmosphere the pressure is not so many pounds, and the boiling point is correspondingly lower. Water boils at about 200° there. On Mt. Black it boils at 187°; and in a vacuum at about 98°, accordingly as the vacuum is more or less perfect.

STRETCHING EMERY CLOTH.—An ingenious device for stretching emery cloth for use in the workshop consists of a couple of strips of wood about 14 inches long, hinged longitudinally, and of round, half-round, triangular or any other shape in cross section. On the inside faces of the wood strips are pointed studs, taking into holes on the opposite sides. The strip of emery cloth is laid on to one set of the studs, and the file, as it is called, closed, which fixes the strip on one side. It is then similarly fixed on the other side, and thus constitutes what is called an emery file, and which is a handy and convenient arrangement for workshop use.

CEMENT FOR LEATHER BELTING.—One who has tried everything says that after an experience of 15 years, he has found nothing to equal the following to cement leather belting: Common glue and isinglass, equal parts, soaked for 10 hours in just enough water to cover them. Bring gradually to a boiling heat, and add pure tannin until the whole becomes ropy or appears

like the white of eggs. Bluff off the surfaces to be joined, apply this cement warm, and clamp firmly.

TO RESTORE RANCID BUTTER.—Rancid butter may be restored, or in all cases greatly improved, by melting it in a water bath with some fresh burnt and coarsely powdered animal charcoal (which has been thoroughly freed from dust by sifting), and straining it through clean flannel. A better and less troublesome method is to well wash the butter first with good new milk, and next with cold spring water. Butyric acid, on the presence of which rancidity depends, is freely soluble in fresh milk.

GUARDING THE KEYHOLES.—NO MORE PEEPING.—A door lock has been patented by Messrs. Garrett G. Ackerson and Julius F. Shy, of St. Louis, Mo. The keyholes for opposite sides of the door are out of line with each other, and the locking bolt has two key bit receiving notches, and there are also special keyhole guard plates, making a simple and strong lock, not easily picked, and preventing peeping through keyholes.

A FARMING PEOPLE.—Out of a total population of 27,000,000, the farming population of Japan numbers 15,000,000. During the past 10 years the improved breeds of horses, cattle and sheep have been introduced with good results. The farmers live principally upon cereals and fruits. Oats, corn, barley, wheat and rye are the chief grains produced; rice of course being the largest.

FEATHER CARPETS.—A Japanese has invented a method of weaving carpets with feathers. The feathers are reduced to a silky state by use of chemicals and then woven like ordinary cotton.

GREASE ERADICATOR.—Take ammonia, two ounces; saltpeter, one teaspoonful; fine soap in shavings, one ounce; soft water, one quart; mix thoroughly and keep in a covered vessel.

PAPER AND LEATHER are made very pliable by soaking in a solution of one part acetate of sodium or potassium in four to ten parts of water and drying.

In packing bottles in cases for transportation, India rubber bands slipped over them will prevent breakage.

GOOD HEALTH.

The Ethics of Pain.

With a vast capacity for pain, man seems to contain no machinery designed to produce it. It has always the air of a disturbance or an intrusion. Yet, although not omnipresent, it is ever imminent, and by it the energies which are most proper to man are suspended or rendered difficult. It often sweeps away the resolves of the will and dictates its own terms to our moral nature. We can account for the whole of bodily pleasure on physical grounds, but for only a portion of bodily pain. To our moral sphere of being, therefore, as I hope to show more fully further on, we must look for a full account of it. If the maximum of voluptuous enjoyment had been the highest object of our nature, still, even so, room would be found for pain in the animal economy, since in order for existence to be enjoyed it must first be preserved. By pain felt or apprehended we are protected from fatal hurts or warned of their existence, and so with regard to the approaches of the fact of diseased action in the body. And this to a large extent animals share with us. Pleasure seems to have no such preservative element in it, and our capacity for it might be conceived so enlarged as to be a constant blind to precaution and lure to destruction. Pain, on the other hand, is largely charged (as shown above) with a preservative power. An enlarged capacity of pleasure would be certainly followed by an increased pursuit of it. On the contrary, enlarged capacity for pain need not imply the increase of actual pain in proportion. Experience, reflection, and precaution, being elements of our nature, might even make a much less amount of pain actually endured consistent with that enlarged capacity. And to whatever extent these elements of our nature, might even make a much less amount of pain actually endured consistent with that enlarged capacity. And to whatever extent these elements of our nature could succeed in averting pain, some such rules of inverse proportion would probably result. But the tendency then would be to absorb an undue part of our energies in constant manoeuvring to avoid pain. This is neutralized by their being kinds and degrees of pain which cannot be so avoided, although few which are not open to some remedial alleviation.—*British Quarterly Review*.

COLD FEET IN BED.—This is a very common complaint, and one that caused a great deal of sleeplessness—first, on retiring at night; and again, early in the morning we are awakened by cold feet, and cannot get them warm except by drawing them up almost to the chin. This occurs not only in the young, but in the middle-aged and the old. For this there are two remedies, the hot bottle and lamb's-wool socks, either or both of which may be used. When we consider that during the day, while we are

active, we wear stockings and shoes, does it not seem strange that at night, when the temperature of the air is lower, and when we are inactive, that our feet should have less covering than during the day? The reasonable plan is to have a special pair of socks for night use, and put them on when going to bed and change them when we get up; the result will be better and more serene sleep, consequently we shall be more able to undergo our daily exertions. I say at once, to all who suffer from cold feet, get a pair of warm socks for night wear. A good wool for half an hour before retiring warms the feet and sends a nice glow all through the body and disposes to sleep. It must not be supposed that these remedies make one less able to stand cold; they are simply to retain the heat of the body and slow of comfort, and, if followed, much benefit will be derived.

Manifold Uses of Cocaine.

The use of cocaine as an anæsthetic and a therapeutic has been taken up rapidly by the medical profession and its application has been made in a remarkable variety of forms of disease. Dr. Knapp, professor of ophthalmology in the medical department of the University of the city of New York, in a recent work "On Cocaine and Its Use in Ophthalmic and General Surgery," says: "No modern remedy has been received by the profession with such general enthusiasm, none has become so rapidly popular, and scarcely any one has shown so extensive a field of useful application as cocaine." The author states his belief that its properties will be the subject of scientific researches and chemical observations all over the globe for many years to come.

Cocaine is applied in shraging the larynx, in cases of bronchitis, and always gives relief. It is applied in probing the tear ducts, in removing tumors and ingrowing toe-nails, in earache, throat troubles, the removal of bullets and the removal of superfluous hairs from the upper lip of a female patient, in dental surgery, in excisions, neuralgia, hypodermic injections for pain and headache through treatment of the eyes. The general advantages of the use of the drug are found to be that its action is transient, and it does away with reflex excitability in the patient. Its useful fields are found to be much more general than was at first supposed probable, reaching even into general surgery.

The secret of the value of cocaine in its application to the mucous surfaces is that it penetrates the exterior coat of the membrane and produces rigid contraction of the muscular fibers, causing thereby a striking diminution of the calibre of the blood-vessels themselves.

One important disease which cocaine has been found to reach, in consequence of the property just stated, is hay-fever. The diseased condition of the mucous membrane of the nose in a pronounced case of hay-fever is marked with a swelling of the veins and blood vessels generally. This is due to a lack of action of the nerves of the coats of the mucous membrane. Cocaine causes a contraction of the muscular coat, thereby expelling the blood, while the extreme dilatation does not return.

A prominent physician says that he has been unable to find that the action of the drug is more than local, and he has observed no reaction following its local use. There is no danger of a "cocaine habit" being formed, in his opinion. The investigations of chemists are being actively turned to methods for reducing the cost of the drug, which is now very large. If a cheap process for its preparation can be found it will prove one of the greatest boons to mankind.

ANCIENT ANÆSTHETICS.—A recently discovered manuscript by Ahelard gives curious information concerning the means employed by the surgeons of his time to produce insensibility during their operations. Pliny mentions a stone of Memphis which, brayed and applied with vinegar, was put on particular parts of the body to anæsthetize them. He, Dioscorides, and Mattheolus speak of putting patients to sleep previous to operations by causing them to take, in bread or some other food, the juice of the leaves or a decoction of the roots of mandragora, or a dose of the plant called morion. Opium and hemp were used by the Chinese. In the polycomposite pharmacy of the thirteenth century a preparation was made of opium, the juices of henbane, mandragora, hemlock and other plants, with which sponges were charged. Having been dried in the sun, the sponges were moistened when it was desired to use them, and then applied under the noses of the patients as chloroform sponges are now applied.

DIGESTIBILITY OF CHEESE.—Of the 18 varieties experimented with, Cheddar was digested in the shortest time, (four hours), while uripie skim Swiss cheese required 10 hours for solution. There is no difference in the digestibility of all sorts of hard cheese, or all soft cheese, but all fat cheeses are dissolved the most rapidly, because, being open by reason of the fat, they are more readily attacked by the solvent. There is no connection between the digestibility and the percentage of water present in the cheese, but there is some connection with the percentage of fat and the degree of ripeness. From examination of the quantity of nitrogen dissolved, the author concludes that, on account of its great digestibility, cheese is the most nourishing of all foods, meat and eggs excepted.—*Journal Chemical Society*.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MOORE.—Amador *Ledger*, April 17: The men who undertook to sink the shaft 100 feet deeper threw up the contract last Saturday, after sinking about 15 feet. The reason for surrendering the job was that an effort was made to keep the mill running and sink at the same time. There being but one shaft and one bucket, the contractors realized that it would not justify them to continue work under such conditions. Since Saturday the sinking has progressed under day labor. Nearly 40 feet has been sunk. Hoisting rock from the shaft has been abandoned until the sinking is completed. Another contract is expected to be let this week. The mill is kept running on the old dump pile, which is said to pay something over expenses.

MIDDLE BAR TUNNEL.—This enterprise is now in over 3300 feet. It was thought that it was immediately under the old works where the rich pockets were encountered. A careful survey was made, which proved that the header was still 30 feet from the upper shaft. Latterly considerable quartz has been met with in the tunnel, some of it of high-grade and carrying the same kind of black gold-bearing metal which has made the district famous. The tunnel is still in the granite formation, and the present indications encourage the belief that rich developments will yet be made. W. A. Nevills and Capt. Nichols went to San Francisco Monday morning, taking with them a sample of rich ore lately taken from the tunnel.

MISCELLANEOUS.—The North Star quartz mine, in Volcano district, was sold by sheriff's sale on Monday last, under a judgment against D. A. Crockett et al. The property was bought in by the judgment creditors, P. A. Chute and Daniel Kees, for \$446, the amount of judgment and costs. It is reported that a fine body of quartz has been struck in the New London mine just south of the Pacific. We have not heard the particulars. The Gover is moving along steadily. Since the new water wheel was put in at the mill the crushing capacity of the stamps has been doubled. At the mine also a great improvement has resulted from the introduction of large iron tanks for bailing out the water. About 30 men are employed about the mine. There is a good deal of prospecting going on among the mines in Pioneer district. On a number of claims there is a quantity of rock on the dump awaiting crushing at Mace's mill. Some of the ore looks exceedingly well and everything points to a revival of the mining industry in this district. The ledges, as a rule, are small but exceedingly rich. Mr. Stillman is putting up the Dryer cannonball quartz mill at Big Bar, bridge for custom work. The repairing of the shaft at the Zele is progressing nicely. They have passed the point where the timbers were crushed together; they are now working where the shaft timbers are in a fair condition, and the work consists in removing the mud and rock with which the shaft is choked.

Calaveras.

MINE SOLD.—Calaveras *Chronicle*, April 16: The Tiger mine, situated at Rich Gulch and owned by Mr. C. Schlund of this place, was sold during the week to an English company. The new company intend putting up a large mill and the erection of new machinery throughout. We have heard that \$10,000 was the price paid for the property.

SLICES ROBBED.—One day last week somebody robbed the sluices in the Hughes' hydraulic claim near the Junction. Mr. Ben Hughes, the owner of the mine, says the robbers must have got in the neighborhood of \$200 as the result of their labors.

INDIAN CREEK.—*Mt. Echo*, April 14: A gentleman recently from the Indian Creek mining district, gave us the following interesting items concerning the mining interests of that section. Indian Creek is situated about twelve miles northeast of Angels, and is at present a lively and promising mining centre. Work is being pushed with a vim and vigor of true energy, as may be seen by the following notes: The Calaveras mine, now bonded to the famous Sheep Ranch mining company, for the round sum of \$100,000 by its owner, Thomas Goodwin, is now being opened up in proper shape under its new management. This mine has been worked at intervals for a number of years, the shaft is now 400 feet in depth. Unassorted ore from this mine milled at the Sheep Ranch mill yielded an average of \$25 per ton. The company intend erecting a 20-stamp mill on the premises shortly. The future of the Calaveras mine is very promising. The Conliff mine now about 80 feet in depth, with a ledge from 4 to 12 feet in width. The richest rock seen in this section for some time was recently extracted from this mine. There is a five-stamp mill on the mine, which is kept in constant motion night and day. The ore thus far milled yielded an average of \$30 per ton, and an abundance of the same character of rock is in sight. Judging from the developments already made at the Conliff, it bids fair to prove the leading mine of that section. The Saltwater mine, which is at present bonded for a considerable sum to the Boston Mining Company of Murphy's, is making a wonderful showing. The shaft is down 100 feet, and shows a well defined ledge five feet in width, of what is familiarly termed by mining men "ribbon" rock. The ore at present is hoisted by the power of a one-horse whim. A large mill and hoisting works are soon to be erected upon the ground. The Esmeralda mine, adjoining the Saltwater mine on the west, from which 25 tons of ore was recently milled in Smith's mill at Angels, yielded \$32 per ton. The shaft is 45 feet in depth, with a well defined ledge in sight. This mine is the property of Kelley & Krause, who have great faith in its proving a valuable, paying property. On the west of the Esmeralda mine, is the celebrated Naragansett mine, owned by W. H. Mathewson, where operations are being exercised with marked energy. A ledge two and a half feet wide has been tapped at the depth of 65 feet. No rock from this mine has yet been milled, but recent assays run as high as \$200 per ton. The rock contains an abundance of galena sulphurets which are immensely rich. There is no mill at this mine, but the facilities for transportation to a mill are all that could be desired. There are

numerous other minor ledges in that section that are being prospected and have made satisfactory showings. The quartz belt lying between Indian creek and San Antonio creek, is possessed of a superior quality of milling ore.

Inyo.

LOWER COUNTRY ITEMS.—Inyo *Reporter*, April 15: German & Mackenzie are preparing to start up the Swansea furnace again. The Ygnacio people are getting out some fair ore, but say it is too base to mill, and it is probable the company will run the furnace in the near future. The output of ore at Cerro Gordo is reasonably good; no new strikes worthy of special mention. There is not much being done at the Darwin at present; Henry Mack has gone to San Francisco in reference to Defiance matters.

IMPORTANT MINING TRANSACTIONS.—Inyo *Independent*, April 17: Several important mining transactions have been made at Cerro Gordo. A. R. Conklin has sold his one-third interest in the Summit No. 2 mine to William Steel, of San Francisco; the latter supposed to have been acting for the Ygnacio Con. Mining Company. H. Kramer, of San Francisco, has also sold to the same party his two-thirds interest in the Summit No. 2, and also the Mono and Mauida mines in the same locality and a half interest in the Potosi tunnel. It is reported that in the latter property a fine body of ore has been uncovered. These transactions place this group of mines in the hands of parties well able to work them and develop them in good shape, and it is more than likely that in a short time the mill at Keeler will have plenty of ore to crush. At the beginning of the week the Maxim mill was started up on a trial lot of ore from a recent strike in the Hope mine, at Chrysopolis. The run will be finished to-day or to-morrow; the result is awaited with considerable interest.

Nevada.

TEXAS.—Nevada *Transcript*, April 15: The prospects of making a good mine out of the Texas are now more favorable than at any time since it became the property of the present owners. The company has had many difficulties to contend with, but nevertheless they have pushed the work along until they have now become satisfied that they have a valuable property. About a year ago they commenced running a tunnel from Deer creek, and it is in a distance of about 250 feet, a good portion of it being in hard rock. About ten days ago they struck a fine looking ledge and stopped work on the tunnel and commenced running an east and west drift on the ledge. They run in on the west drift about 80 feet and now have a ledge of a little over five feet, and running through it is a streak of solid ochre showing free gold, which will undoubtedly pay \$100 or more per ton, and the rest of the ledge looks well and will probably yield \$15 or \$20 per ton. In the east drift the ledge is a little over a foot and looks well. About 70 tons of rock have been taken out and will be crushed at the Deadwood mill as soon as the roads are passable.

Placer.

DUTCH FLAT.—Cor. *Placer Republican*, April 14: Foss & Ballantyne, two mining men from San Francisco, have commenced running a bedrock tunnel for the purpose of prospecting the old Kinder claim situated at Bear River crossing, about ten miles from here. I understand they have purchased the ground. Parties who are acquainted with the property think they will strike good paying gravel. S. Wheeler, formerly Superintendent of the Liberty Hill mining company, has leased the Glenbrook place between Nevada City and Grass Valley, for a term of five years. Saturday afternoon, the Phoenix mine ran into some exceedingly rich ore, in the stope above the bottom level. A blast was put in and the ledge opened up its treasure chamber bright with pure gold. From a very little place about three candle boxes full of specimens were taken, aggregating about \$600 or 700. The ledge here is from ten inches to one foot in thickness.

LIVE OAK.—F. Chappellat says he is making good progress in developing the Live Oak mine, and thinks it will turn out as well as the May Flower. The shaft is down and the tunnel was begun on Monday. The shares in this mine are selling at fifty cents.

THE OLD PENNSYLVANIA.—Nevada *Transcript*, April 17: The Pennsylvania mine, on Wet Hill, is about as well known as any mine in this district, notwithstanding it has not been worked for a good many years. It was owned at one time by Harvey Helm, W. L. Tisdale and others, who sold it to an English company for a large sum of money. For a while after the new company bought it considerable gold was taken out. As it did not yield as large returns as the English company expected, they ordered it closed down. They had run into low grade ore which did not pay for the working, and instead of prospecting for better rock they became disgusted, and no work has been done on it since they quit. A year ago Thomas & Co. purchased the property at a tax sale, and have recently obtained a deed from the English capitalists. Now that the new owners have a good title to all the patented ground of the Pennsylvania they intend to make such arrangements whereby it will be worked again. A good part of the ground contains a rich gravel bed, and it is believed by old miners that if it was worked for gravel alone it would pay handsomely.

Plumas.

INDIAN VALLEY MINE.—Greenville *Bulletin*, Apr. 14: In consequence of necessary repairs on the wire ropes at the Indian Valley mine, the mill has been idle for the past month. The ropes gave way and it became necessary to purchase new ones or repair old ones. The latter course was pursued. An experienced hand from San Francisco worked twenty-nine days repairing the two ropes, which are now considered nearly as good as new. The rope has been put in place and the hoisting of ore resumed from the chute out of which quartz was being taken at the time the mill stopped. Crushing was resumed Monday and the mill is expected to run regularly. The shaft has been sunk about 50 feet by Messrs. Skinner and Taylor. A "station set" of timbers have just been put in, and the sinking of the shaft will continue for another 50 feet. The progress now made is about one foot per day. A Burleigh drill is now in the shaft, also in the Union drift, which is going ahead at the rate of about twenty-four feet a week. The breaks caused by the heavy storms of winter, have been repaired and the mine is in good condition for regular and

successful working. The contractors have done good work.

GRANITE BASIN.—Plumas *National*, Apr. 10: Mr. Rockefeller and Mr. W. Wright have come into the Basin. They will commence to get the mill and mine in good running order, and will start up in good shape as soon as the snow goes off. J. J. Hall has returned from his trip down with bullion. The mill is running steady under the care of the Basin's most successful amalgamator, Joe Peppin. Arthur Christie's lower tunnel is in over five hundred feet, and in very rich rock. He is going to crosscut to his other ledge, which lays about forty feet to the right. The gold is coarser than in the upper tunnel.

San Bernardino.

CALICO DISTRICT.—Calico *Print*, Apr. 11: Robt. Anderson and his partner, E. Somers, of San Bernardino, have started a level in a 100-foot shaft on the Young Waterman at a depth of 35 feet, and are drifting both ways on the ledge and also crosscutting. One of the drifts along the wall will intersect another shaft which is down 100 feet. Judging from present indications Mr. Anderson expects to strike a rich body of ore before he proceeds much farther. This mine has been a continued source of profit to its owners, as well as to the chloriders who have at times had leases on the same. During the past few months the owners' one-fifth royalty amounted to about \$250 per month, and the mine has yielded them, over all expenses, about \$3,000, on the strength of which Mr. Anderson some time ago took a trip to Europe. This mine is among the most promising of West Calico. The Tibbets' Bros., who have a lease on a portion of the Young Waterman, are chloriding and taking out a few sacks of very good ore each day. Mike Welch also has a lease on this mine and is running a tunnel which is in about 15 feet and is extracting about a ton a day of good ore.

SUE MINE.—This mine is owned by Waterman & Porter and J. B. Osborne, who have 18 men busily engaged in drifting, stoping, tunneling and sinking. Two teams are daily engaged hauling ore to the Waterman mill from this mine. The main shaft is down about 160 feet and the main tunnel is in about 400 feet. A considerable quantity of ore has been taken out and there appears to be an unlimited supply yet remaining. The mine is being worked in first-class order under the foremanship of Jos. Hoskins. There are about 15 men chloriding on this mine, none of whom are making less than ordinary wages, the majority averaging three or four times that amount. Wm. Reed (the dancing master) and Amos Elliott have a lease on the Bedford Forest in West Calico, a claim owned by Wm. Reed, owner of the Humbug mine. They are drifting and taking out from 2 to 2½ tons a day of very rich rock which runs as high as \$100 to the ton. From present appearances these gentlemen are pretty sure to make a handsome stake out of their lease. Waterman & Porter have six men at work sinking and drifting on the Jessie Tay, who are taking out very good ore which is hauled to the Waterman mill. There are also four men chloriding on this claim who are doing well. There are a couple of men chloriding on the Josephine.

VERO.—This mine is located in the same belt as the Occidental in Northeast Calico, and is owned by H. I. Seward and the proprietors of the Grange Store of Los Angeles, and others, and has been worked principally by chloriders since its first discovery several years ago. From \$15,000 to \$20,000 have been taken out of the mine, while no considerable depth has been attained. It is still a good proposition for chloriders, some of whom are realizing from \$6 to \$10 a day to the man above expenses. Were sufficient capital invested to open up the mine in good shape it would reach a great depth and yield a handsome percentage on the investment. The other day the force on the King mine was increased by twenty men. This mine is looking well and it is the intention of the company in a few months to put on a larger force than ever before, just as soon as the mine can be put in such a condition as to advantageously accommodate them. Undoubtedly the company will be obliged to increase the capacity of their mill this fall, and it is reported that they intend to do so. The Burning Moscow, owned by the Oro Grande Co., has six men at work, two of whom are starting a shaft to find the walls to the ledge, while the other four are at work on the 50-foot level of the 140-foot shaft, and are taking out considerable ore. There are about 700 tons of low and high-grade ores on the dump. This mine has a most promising future before it, and is in the same belt as the Silver King. Last Wednesday the Leaching Works started up again under the management of W. A. Sharp. Success has attended the operations of this enterprise so far, and a new method of reduction has thus been inaugurated in the camp which will utilize the thousands of tons of low-grade ore lying on the dumps of numerous mines, converting the same into bullion and augmenting the wealth of the camp. There are several men at work on the Alvord gold mine clearing off the dumps preparatory to continuing operations on a more extensive scale.

THE KING MINE.—Calico *Print*, Apr. 17: A few days ago the force on the King mine was reduced considerably owing to the lack of milling facilities. In an interview with Mr. Dedrick Bahten, superintendent of the mine, we learned that it is the intention of the company as soon as possible to add fifteen more stamps to their mill near Daggett. At present their mill is entirely occupied in crushing ore from the Waterloo, and there is enough ore in that mine to keep the mill in operation indefinitely. Mr. Bahten informed us that the King mine is looking well, but that it is necessary that the capacity of the mill be increased so as to enable them to crush low grade ore without assorting, and at a reduction of milling expense. It will not be long before a larger force than ever will be employed in the King and other mines belonging to the Oro Grande company. There seems to be a general impression among business men here that the liveliest times are yet in store for Calico, which will be brought about by the increase of milling facilities and the consequent employment of larger forces of men to keep all the stamps constantly dropping. McBride and Miller have 14 men at work on the Blackfoot mine and are taking out a large quantity of fine ore. They have two teams busily engaged in hauling the ore to the mill at Daggett. Three men are at work in the Kearsage, taking out some fine ore from a 24-foot drift from the main shaft. There are about two tons of

ore on the dump at present. This work is being prosecuted by Robt. B. McCullough, Stacy & Co. On the south end of the same mine the Coleman shaft is looking fine. A large deposit of low grade ore has been struck in the same by Don. Craig & J. W. Coleman. Keyes & Noel, who have a lease on the Blackfoot, are doing well, and are taking out about half a ton a day of ore that assays well. The other day they shipped 5 tons to Holberg & Thede's mill. There now remains on the dump three tons. They have sunk an incline about 40 feet. Water has been struck in the Runover Co.'s new well, a mile or so below town, at a depth of 159 feet. As soon as it is ascertained that an abundant supply of water can be obtained the erection of a mill will be commenced. Peter Nichols and Robt. James have a lease on the Blackfoot and are sinking on the ledge, stoping eastward and taking out about a ton a day. They have shipped about 80 sacks to Barber's mill. The Lander Bros. are taking out some good ore from the Phoenix which is situated just below the Old Falls in the Oriental canyon road. Two men are at work driving in a tunnel, which is in about 20 feet.

ARROW GOLD DISTRICT.—Cor. *Calico Print*, April 17: Since last writing you I paid another visit to this district. I find that with development it is showing up all that I vouched for it. The Mexican mine has made several openings all showing rich ore. The Queen has a shaft down 35 feet showing a fine body of rich gold rock. Tom Jackson has a fine showing of free gold on the big ledge. Sam King the recorder is also opening the Relief which looks well. The Red Cloud shows a ledge of six to eight feet and the owners have about 50 tons of good ore piled on the dump. The survey of the railroad to Providence will bring Arrow camp within about eight or ten miles of railroad communication. There can be no question but Arrow will make a good gold mining camp.

MESCAL.—The Cambria mine of this place under bonds to Los Angeles parties is opening up well. The new tunnel 125 feet lower than the old one shows a large body of high grade ore. The owners would now be glad if the parties bonded would fail to connect.

IVANPAH.—This old camp still holds its own. Tom McFarlane has leased the Allys mine and is working a few men. Miller & Van Winkle are taking out some rich shipping ore from the Alps and several others are chloriding on various claims. The mill at present is shut down but will start up shortly.

Shasta.

MILL.—Shasta *Democrat*, Apr. 14: Nearly all of Tom Greene's new quartz mill is on the ground. The L. M. Mining Company of Squaw creek will have its mill running this week. We hear that two new quartz mills are being shipped to the Bullychoop mines. Levy Longfield has sold his quartz claim on Spring creek to San Francisco parties. Bell & Hopping's Huntington mill on their mine in Old Diggins district is running night and day. Davis, Warner & Co. have their tunnel in on the Clipper 60 feet, and rich ore is exposed all the way. J. O. Stewart, formerly of Copper City, is superintending the Manzanita mine on Sulphur creek, Colusa county. Jim Salee returned last Saturday evening from a brief trip to San Francisco. He informed us that he took charge of Iron mountain last Monday. The Croesus Mining Company has got its mill in running order and she works like a top. The storm that has prevailed for the past week has prevented them from laying their ore chutes, or they would now be running steadily. Tom Greene, who was down from French Gulch a few days ago, reported a rich strike that was made by two miners on a claim adjoining the old Washington mine. Samples taken across the vein, which is three feet in width, assayed \$800 a ton in gold. The ore is free milling. Vannoy is prospecting the Newton, which adjoins the Uncle Sam mine, and is exposing some very fine ore. Reidout's mine, adjoining the Snyder, is showing up splendidly. Fine prospects have been struck in several places on the Consolation lately. This claim joins the Clipper, on the east. Peter Shearer returned from San Francisco the latter part of last week and informed us that he has made arrangements with parties who will put up works on his mine. They propose to extract the precious metal by smelting the ore by a new process. Peter expects some of the machinery here in two weeks. Carson & Snyder have driven their tunnel in 150 feet, which gives them from this point to the surface a raise of 140 feet. At this point they crosscut the vein and exposed ore that will mill all the way from \$100 to \$2,000 a ton. It is a splendid strike for Squaw creek, and proves at least that this vein carries rich ore as depth is attained. At this depth they can show as rich rock as can be produced from any mine in the county.

Trinity.

DEADWOOD.—Cor. *Trinity Journal*, April 17: All the mines are flourishing and everything prospering. All the arastras are in full bloom. Mr. J. F. Dolliffe is crushing his ore in Jacob Paulsen's arastra, and John and Stewart Gibson have both their machines running in good order crushing ore from the Little Gem and Blagrove mines. Next is the Frick & Davis arastra, run by the esteemed engineer Daniel Goon. The next is that of J. R. Boles, which spins around in its lively course. McDonald and Brown Bear stamp mills are rattling away in a business-like manner, and thus in the latter part of spring will Deadwood turn out her share of bullion. All the mines are doing well. VanMatre Bros. are prospering in their little bonanza, having plenty of good ore in sight. Wm. Elgrave is also doing as usual; neat dividends are constantly the result of this mine. Billy McLiman and J. Kemp are the discoverers of a rich strike on the A. B. mine. A trip to Eastman Gulch last week found that little district in a prosperous condition. Bob Hamilton and Joe Gifford are working away industriously on a very bright prospect. They have had a clean-up recently which proved very satisfactory. There are other mines in Eastman Gulch which are doing well, and it may not be long before Eastman Gulch will be up in the "tens."

NEW RIVER.—Humboldt *Standard*, Apr. 14: Mr. J. S. Thomson arrived in this city Thursday evening from New River, and reports everything there in a flourishing condition. He says that the rains have delayed operations considerably, but that things are being straightened out in shape, and that it will not be long before the camp will present a lively appearance. At present there are

about one hundred men there, all of whom are working. Employment could be found there for many more men if they would seek for it. Several of the mines have started up but others have been delayed, owing to the water in them, but this will soon be overcome, and they will soon be running. There were five assays at work when Mr. Thompson left, and the prospects are good, some of the cleanups showing good results. The Mountain Boomer made a cleanup just before Mr. Thompson left, and showed an average of \$183.50 per ton. He is confident that when the mines get fairly started the results will be satisfactory to all interested. New River is like every other new mining camp. It started with an immense boom, and everybody expected to make large fortunes, but a reaction came and then the cry was, "There's nothing in it." But let things get down to a solid working basis, and there is no doubt that the New River mines will be a source of profit to many.

FROM WHITE ROCK.—H. Smith, who came down from New River with J. S. Thomson, gave us the following items concerning the mines: All are running and no ore has assayed less than \$20 and some has panned on \$138.50 per ton. This latter was Mountain Boomer ore. Weather has been fine, little snow has fallen, one fall being 16 inches but staying on the ground only a short time. Mr. Soule has made a rich find at the Oro Fino mine which claim he has leased, and Chas. Hanson and James Gulick have also struck a rich ledge, which is an extension of the Grover (Cleveland) mine. Geo. Dean built a two-stamp mill in a house but had to tear the house down to get it out. The Mary Blaine mine is covered with snow. John Toms, wife and four children arrived from Kettle-snake a few days ago. The distance is about 20 miles, and the family all walked, the age of the oldest child being fifteen and the youngest seven. We gathered from Mr. Smith's remarks that there is great confidence in the future of New River and that between 75 and 100 men are there. Little prospecting is being done in the adjacent country, operations being confined to New River.

Tuolumne.

ROBBED.—Tuolumne Independent, April 17: On Friday night of last week the mining claim of Shepard & Moss, at Dragoon Gulch, was robbed. The ground on which the claim is located is leased of Mrs. M. McCormick. The run had been for five days, on some of the best ground, and the claim had been paying good wages previously. It is not known how much gold was stolen, but they must have obtained considerable; as, where they had washed down the sluices, a streak of gold was left all the way. The ground-slucie was not touched, as there was too much dirt in it to move in a limited time.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, April 17: The fine ore body being developed in the explorations above the 3100 level shows better at the present writing than anything heretofore found at that depth, and as before remarked, it promises to materialize into a genuine old-time bonanza. It is being followed upward and northward—upward four sets of timbers, and northward six sets. The best ore, which is carefully selected and sacked, assays up in the hundreds, and yesterday, to the extreme northward, it was looking better than at any other point. The character of this ore is also more favorable than in the levels above, being of the loose, sugary, fertile character of pure sulphate and chloride, free milling ore peculiar to the rich bonanzas which have been worked out at either end of the great lode, yielding their numerous millions. It certainly is a very favorable and encouraging circumstance for holders of Savage to contemplate, as showing a tendency to run into that mine and perhaps make its bonanza culmination there. It is also of important significance as showing superior ore at the lowest depths and indicating what may be found by the deeper explorations already inaugurated. On the 2900 the north lateral drift is progressing well, and about to-morrow will arrive at a connection or intersection with crosscut No. 4, where the best ore on that level was found last summer, before the flooding of that and the other lower levels.

POTOSI.—The main south or southeast lateral drift last evening was in 347 feet from the Chollar south line, or 457 feet from the switch at the west drift from the Combination shaft. The drift is still running in the foot-wall formation along the west side of the ore vein, in dry, favorable working material, and the proposition is to continue it through to the Bullion line before stopping.

ALTA.—The main south lateral drift on the 700 level has now run into the Benton ground about 100 feet. It is being headed toward the old workings of the Lady Washington mine, and has about 150 feet further to run in order to connect. Some pretty good ore was formerly met with at that point, which will bear further investigation.

GOULD AND CURRY.—On the 630 level the crosscut west is still running in vein porphyry, not having reached the main ore formation. The lateral drift south or southeast is in quartz, and its face is within 100 feet of the Savage north line. Good progress is being made, and all prospects are encouraging.

BEST AND BELCHER.—Good regular progress continues to be made reducing the water in the Osbiston shaft, about five feet per day being made. But little over 100 feet of water remains to be raised in order to reach the bottom of the shaft. This will take six weeks, after which sinking the shaft deeper will be the proposition.

CON. CALIFORNIA AND VIRGINIA.—About 380 tons is the regular daily yield, giving an average assay from battery samples at the mills of about \$14 per ton. The explorations on the 1400 and 1650 levels continue making excellent progress, with no new features of particular interest to report.

SIERRA NEVADA.—On the 520 level the west crosscut makes good progress considering the hard dry nature of the rock, which is quartzite and vein porphyry, working unfavorably. Some \$40 ore is being extracted and milled from the croppings of the mine on Cedar Hill.

MEXICAN.—The 500 level operations having been abandoned all work is concentrated upon running the joint Mexican and Union drift on the 700 level. This is now in 675 feet. Material in the face, vein

porphyry, with streaks of clay and quartz.

UNION CONSOLIDATED.—An east crosscut has been started at a favorable point on the 500 level during the last few days. It is running in vein porphyry at present, but will probably strike something better shortly.

CROWN POINT AND BELCHER.—About 380 tons continues to be the daily yield, mostly from the upper workings, yet a large amount is hoisted from the 1500, 1600 and 1700 levels.

CUOLLAR.—Sinking the Combination shaft deeper is not contemplated at present, or until the explorations of the Potosi ground through this mine on the 3100 level are completed.

OPHIR.—On the 400 level the principal work has been the easing up and repairing of the timbering. Nothing new on the 300 level. Work going ahead as usual.

YELLOW JACKET.—Daily yield about 130 tons from the old workings above the 1300 level. Nothing new to be mentioned in any part of the mine.

KENTUCK.—About 50 tons per day continues to be the daily yield, keeping the Rock Point mill steadily employed.

Columbus District.

HOLMES.—Candelaria True Fissure, Apr. 17: We are still working in the McCuen ledge, near the old Northern Belle 7th level. The ledge is small, but is producing some good ore. In the 8th level we are stopping ore from the Morris ledge. This stop is not as large as it has been, a portion of the east end having been broken through to the drift. Sixty feet below the Morris we are taking a large amount of ore from this stop. From the 8th we have drifted west and connected with the 1st winze that was sunk by the General Thomas Company ten years ago. Where we made this connection we have a good development from which point we are extracting ore and sending it to the mill. We are also sinking below the 8th to connect with the 10th. The gypsum ore body in the 8th stop is still producing well. In the eastern end of 8th level we are drifting east to connect with the ore body in top of 9th raise. We have driven the main 8th east a distance of 30 feet during the past week. It still has 120 feet to go to reach the point where we are working in the ore. In the drift from raise above 9th level we have a good body of ore. It is fully three feet wide and the ore is good. It will average fully \$100 per ton. This is an entirely new country and 200 feet east of any work done at this point.

MR. DIABLO.—The stop above the west drift on the 4th level looks well and is giving some \$60 ore. We are getting some \$40 ore between the 3d and 4th levels west of the shaft. Between the 2d and 3d levels east of the shaft we are taking out a small amount of \$100 ore. The intermediates between the 1st and 2d levels are giving \$40 ore.

Cortez District.

BULLION HILL.—Cor. Eureka Sentinel, Apr. 14: During the past few days there has been some stir here over the discovery of a very promising ledge in Mill Canyon, close to the Berlin mine. The ledge is twelve inches wide at the outcrop, and has been stripped about 20 feet. It is a contact vein. The hanging wall is blue lime, and the foot wall a sort of quartzite. The lucky discoverers are James W. Campbell and W. Morgans. The ore is of a peculiar character. Nothing of the kind was ever before found in this camp. No one here was able to say what it was. He sent four samples of it to Mr. Clark, of the Garrison leaching works who assayed it, and obtained the following results: No. 1 went \$453.18 per ton, No. 2 \$396.74, No. 3 \$96.64 and No. 4 \$49.78. H. S. Smith and R. S. Young are running a chute from the main works to the upper tunnel for air. John Silver is extracting some fine ore from the Lone Star. W. A. Earles is sinking the main shaft of the property. W. Lewis is doing assessment work on his locations. Thomas Gilman has resumed work in his mine with a force of three men, himself and his brother.

Eureka District.

ORE.—Sentinel, April 12: Fourteen tons of ore were shipped in from the Iron Clad mine, Secret Canyon, to the Eureka Co. reduction works on Wednesday last. Eleven tons of ore were shipped during the past week to the Eureka Co. reduction works from the Frazier and Molino mine on Adams Hill. Ore shipments from the Adams Hill mines to the two reduction works in town continue. During the week ending yesterday 19 tons were shipped to the Eureka Co. works from the Paul Pry, and 23 tons from the Wide West. From the Lord Byron mine on Prospect Mountain 6½ tons of ore were shipped to the Eureka Co. furnace the other day. From the Dunderberg mine, owned by the same company, 30½ tons were shipped during the week ending yesterday.

Hawthorne District.

LAPANTA.—Inyo Independent, April 17: The owners of the Lapanta mine, near Hawthorne, say they have already taken out gold enough from the mine to pay back the purchase price of \$35,000, and pay a handsome dividend beside. The mine is now reported looking better than ever. The last shipment was a bar worth \$10,000.

Kirman District.

TO BE DEVELOPED.—Virginia Chronicle, Apr. 14: Owners of mining claims in Kirman district, on the western slope of Mount Davidson, are making preparations to develop their properties as soon as they can get supplies and lumber for timbering on the ground. Mr. Kirman, owner of the Norrie mine, is waiting impatiently for the ground to become firm enough to admit of hauling timbers to be used in the shaft. As soon as lumber can be got there he will put a shaft on and resume sinking for the body of the vein, the apex of which was cut at a depth of 135 feet below the surface. The bottom of the shaft is in vein matter, and the owner is confident that the vein itself will be cut before sinking 50 feet below the present depth. He is a firm believer in the infallibility of the power of the divining rod, in the hands of Mr. Norrie, as an indicator of the presence of minerals held in the bowels of the earth. He has already invested \$25,000 to prove the truth of the theory, and is willing to back his faith with four times that amount. Mr. Kirman says he puts up his own money in the enterprise and gives employment to a number of men, and therefore the public have no right to denounce his efforts to develop a mine as Utopian or visionary until he has demonstrated the truth or falsity of his theory. Mr. Thos. Reynolds, the hide dealer, has a location on the plateau a short distance northwest of the Norrie,

and has sunk a shaft 20 feet. He will send it down 200 feet the coming summer. This mine will be operated by an incorporated company. It was located on the authority of the divining rod, which, in Mr. Norrie's hands, is said to have indicated the existence of a valuable mineral deposit about 200 feet below the surface. Numerous other locations have been made in the district, numbering 20 or more within a radius of three square miles. The owners of several of these are now on the ground developing their property.

Revelle District.

MILL.—Belmont Courier, April 12: The mill at Revelle will make quite a run this summer on ore from the mines of that district, and as they are of a high grade the run is almost sure to prove satisfactory.

Taylor District.

STARTING UP.—White Pine News, April 16: The Argus mill, after a suspension of six weeks, during which it was put in tip-top order, started up Thursday evening. From this on the bullion will flow out.

Tuscarora District.

BELLE ISLE.—Times Review, April 16: North drift from the east crosscut, 450-foot level, has been extended 21 feet. Joint Belle Isle and Navajo crosscut, 150-foot level, has been extended 21 feet.

GRAND PRIZE.—The north drift on the 200 has been extended 20 feet during the week, and a drift has been started east from it. Upraise above the 200 lateral is up 33 feet. Stopes at present are looking poor and not producing much ore.

NAVAJO.—Crosscut No. 5, east lateral vein 350-foot level, has been extended 16 feet. North drift on the east vein, No. 5 crosscut same level has been extended 8 feet. Crosscut No. 2, 250-foot level, has been extended 6 feet.

Washington District.

ORE.—Shaw is still working his mine in Washington district, and Chas. De Long is taking some fine ore from his location there.

ARIZONA.

ALUM.—Clifton Clarion, Apr. 14: We had occasion to mention some time ago the discovery of an immense deposit of alum on Chase creek, and on the line of the Coronado railroad. Our reporter visited the scene of the find last Saturday in company with Messrs. Van Hook and Campbell, two of the interested parties, and learned by personal observation that the half had not been told. The entire face of the mountain or bluff, for a distance of 500 feet or more in length, by a couple of hundred feet in width, and nearly 160 feet in depth is a solid mass of alum, at many places occurring in a nearly pure state, and in others being highly impregnated with copper. It exists in quantities sufficient to supply the world for centuries.

TOMBSTONE.—Democrat, April 16: The most noticeable fact, and at the same time encouraging, is the increased prosperity of a large force of chloriders at work on outlying properties, all of whom are making money. Another encouraging feature is the gradual increase of force on nearly all the working properties, as well as the resumption of operations on several properties, which for some time past have been unworked.

TOMBSTONE MILL AND MINING CO.—This company still leads the van as an employer of wage workers. Since last report nothing of importance has transpired except the putting to work of a number of extra miners, and Superintendent Cheyney informs the reporter that others can also shortly obtain work there. The main output of ore continues to come from the Troughnut, something over 2000 tons monthly being reduced at the Girard mill. As before stated in these columns, the company are working ten or a dozen different properties.

LILLIAN.—This promising property, which was only located the first of the year, is developing splendidly. The strike which first brought it into notoriety, at a depth of 50 feet, is of greater magnitude than at first supposed. The shaft is down 65 feet, still in ore, but no drifting or crosscutting has been done. The owners of this property, who recently paid \$4000 to quiet title, have since taken out several times that amount of ore.

MARGARITA.—The strike recorded in last report is being vigorously worked, and a good deal of fine ore, running upwards of \$150, is being raised. The main shaft is down 60 feet, from whence a drift is being run on the ore body.

LITTLE GIANT.—Work progressing as at last report and with continued good results. The main shaft is down 85 feet, from whence drifting on the ledge has been run for 60 feet, all in ore.

RANDOLPH.—Not much is being done on this property, which bids fair to prove a big manganese proposition, as well as a good silver mine.

GRAND CENTRAL.—Usual amount of 40 tons being raised daily and sent to the mill.

COLORADO.

POVERTY GULCH.—Elk Mt. Pilot, April 14: The Augusta mine in Poverty gulch will, as soon as the snow permits, be operated. It produced last year ore of the value of \$47,000, and that too, at a great disadvantage, as all the ore had to be packed about five miles on burros, and the company was at the same time engaged in constructing a tramway from the mine to Pitsburg. This latter work was interrupted by a severe storm when almost completed, and as they had relied upon its completion to get winter supplies to the mine, they had to close down. We are informed that some damage to the tramway by snowslides during the winter has been done, and a portion of the ore house at the foot of the tramway also carried away, which will necessarily delay active operations for some time after work has begun. The Excelsior mine in the same locality, and now worked under lease by A. K. Chamblin and John Alexander, is also a property of which we may well be proud. It was worked under lease last year and shipped ore of the value of nearly \$12,000, and will no doubt exceed that amount this year. This mine, as well as the Augusta, will make a record this summer which will be a credit to this section. The Lakeside, another property in Poverty gulch, has received considerable development the past winter at the hands of J. C. McQuarrie, who did the work for an interest in the claim. Mr. McQuarrie is mashing on the shape of the Lakeside lode and thinks it will

eventually rank with the Augusta. So far, this property has made no shipments of ore, but it has some good ore in sight this spring and will probably make some small shipments. A contract has just been let on the Buffalo on Cascade mountain, in the same vicinity with the Augusta, Excelsior and Lakeside. It is controlled by ex-Postmaster Sidney Selover, and is said to be a fine prospect.

IDAHO.

LUCKY BAR.—Wood River Times, Apr. 14: Messrs. Rorem, Taylor and Furey spent a whole day with assistants, in panning samples from various parts of the claims. All with the uniformly excellent results already obtained. The dirt goes from five to ten cents to the pan, and higher. Whether it will do as well on a large scale, however, remains to be demonstrated. That has been the difficulty heretofore. The gold could not be caught because too fine. As the company intends to use burlaps, however, it expects to succeed. Sheriff Furey says that, close to the bank of the river, the pay dirt shows up fully five feet thick. The rich streak is about ten to twelve inches thick, and underlain by a loose gravel that will doubtless yield equally with the richer streak above, as the ground is much more favorable to work. Take it all in all, Sheriff Furey says, he never saw or heard of such rich ground as that under consideration. Whether it will pay to work on a large scale, with machinery the expense of running which will amount to fully \$100 per day, remains to be demonstrated.

NEW MEXICO.

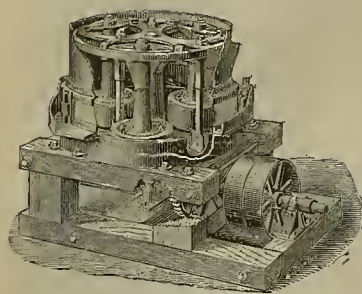
SOCORRO NOTES.—Bullion, April 16: Col. David Branson, who was in this city last week, is dumping a most excellent fluxing ore from the Humboldt Mining Company's property in the Black Range. Haase, Ott & Co., owners of the Water Canyon concentrator, have decided not to increase the capacity of their present plant. Col. E. L. Mann continues to develop the north extension of the Silver Glance, in the Limar district, with no small prospect of ultimately reaching pay rock in important quantities. W. Cook and C. A. D. Conklin have leased the Mackay, in the Pueblo district, and are raising pay dirt continuously. They are preparing to ship their product to the Billing works, in this city. Walter C. Hadley supercedes F. M. Endlich as manager of Sierra Grande Mining Company. Major J. B. McGee and F. M. Melick went to Kelly on the 10th inst., and paid off the boys working on the Graphic and Grayhound mines. At the close of this month the working shifts on these properties will be reinforced. Mr. Gustav Billing has purchased some valuable mining properties near Silver City. They will be superintended by H. Huber, superintendent of the Kelly mine. This is a guarantee that they will be explored *tout de suite comme il faut*. Abeyta Montoya and F. A. Manzanarez will, the coming month, commence extensive development of their valuable mining properties in the Socorro mountains. These claims have ore in place and it is sufficiently high grade to pay a handsome revenue, if raised in sufficient quantities; it consists of both milling and smelting ore. E. H. Patterson's Broadgauge claim in Cat Mountain district, situated 11 miles west of Magdalena, is worked in shaft No. 2. This opening is now 22 feet deep, and makes on its bottom a fine showing of silver-bearing quartz, which also contains gold. Mr. Patterson will sink without loss of time an 80-foot shaft on the west end of this claim, 800 feet distant from the former working. At this point the mineral assays so well that he feels encouraged to prosecute systematic developments. The Sierra Grande Co.'s lixiviating works at Lake Valley, are running smoothly, and are saving 87 per cent of the value of their mineral. This value has increased to date about one per cent on every hundred tons of ore handled, and the enterprise, as a whole, is a complete success, aside from the failure of the machinery to do its work, which is due to too much economy in original construction; but a small additional expenditure on the machinery will increase the capacity of the plant to 100 tons per day, at a total cost not exceeding \$4 per ton.

OREGON.

GOLD HILL.—Cor. Granite Pass Courier, April 16: Boyd & Johnson, our persevering prospectors, are developing a valuable piece of mining property three miles south of here, in the Blackwell hills. G. F. Dyer, the mining expert, has gone to Portland for the purpose of purchasing a quartz mill, which he intends to have running in a short time. Thos. Chavner has agreed to donate land for a mill site and water privilege free. John Swinden has the best quartz ledge in Jackson county. The rock will speak for itself; there is gold in all of it, and in places it will yield from two to three hundred dollars to the ton.

UTAH.

REVIEW.—Salt Lake Tribune, April 17: The receipts in this city for the week ending April 14th, inclusive, were \$183,920.48, of which \$123,510.87 was bullion and \$50,409.61 was ore. For the previous week the receipts were \$77,868.87 in bullion and \$21,579 in ore, a total of \$99,447.87. But part of the ore receipts reported this week properly belonged to the report of last week, and would have been included in it had the returns been received in time. The Ontario output for the week was, fine bullion, 2,775,970 ounces; bullion slags, \$1,408.31. No ore sales, the roads being impassable for shipments. The daily product for the week was 892,936 ounces of fine bullion. No ore shipped because of bad roads. Nothing is heard from the Horn Silver. The reports of the speedy reopening of the smelters of that company are probably premature, as the ore so far developed is not understood to justify it. Fine bar receipts here for the week were valued at \$55,242; base bullion, \$25,015. The product of the Hanauer smelter for the week was \$20,965; of the Pascoe, \$2,020. The Germania smelter, after a stoppage of two weeks for the annual cleanup and repairs, began shipments again on the 9th. It has enough ore on hand to supply the capacity of the furnaces till the roads get in condition for regular shipments. Its product since the recent starting up has been three cars of bullion, valued at \$8,423.38. Ore receipts here for the week were \$516; Queen of the Hills ore, \$3,710; silver and lead, \$5,090; lead and silver, \$41,093.61.

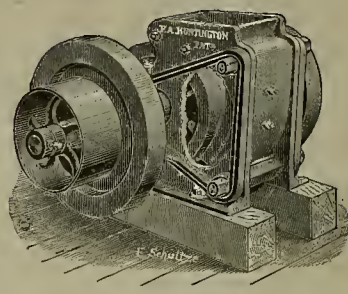


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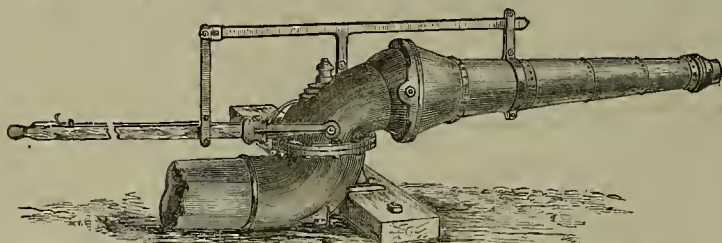
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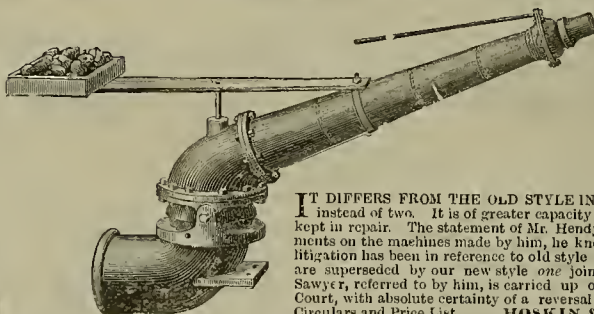
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facture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under
the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et al.

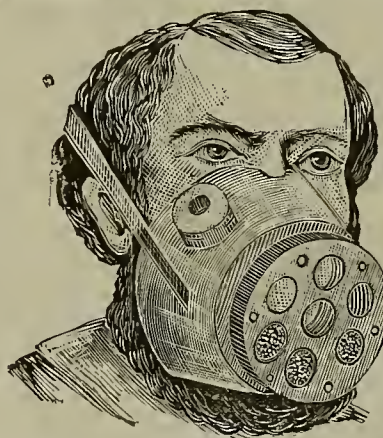
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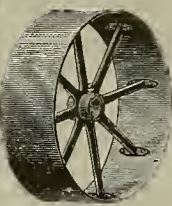
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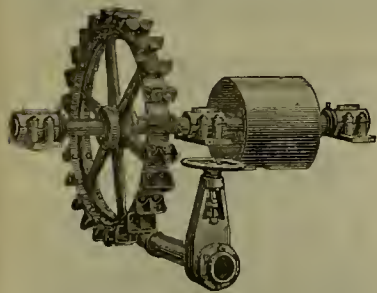
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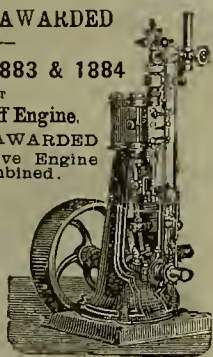
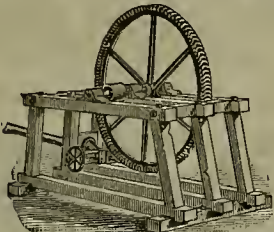
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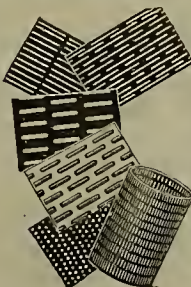
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From the official report of U. S. Patents in Dswey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING APRIL 13, 1886.

- 339,865.—RIVING MACHINE—I. A. Davis, Englewood, Cal.
 339,911.—SELF REGULATING LAMP—V. Di Marzo, Benicia, Cal.
 339,761.—HARVESTER—Gillman, Frost & Foster, Santa Rosa, Cal.
 339,763.—HARROW, ETC.—O. Gravelle, Garfield, Nev.
 339,646.—WIRE ROPE AND CABLE—A. S. Hallidie, S. F.
 339,767.—FRUIT DRIER—A. J. Hatch, S. F.
 339,776.—TURNING JOWALS OF CRANK SHAFTS—W. J. Hogan, S. F.
 339,652.—SLATE WASHER—P. D. Horton, S. F.
 339,681.—TREATING CRUDE ALKALINE—R. G. Neuschwander, S. F.
 339,685.—FLY TRAP—J. Monroe Perry, Oakland, Cal.
 339,707.—MOLE TRAP—F. Stanke, S. F.
 339,950.—STEAM BOILER—A. W. Van Dorston, Portland, Or.

NOTE.—Copies of U. S. and Foreign patents furnished by Dswey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Mining Share Market.

There is nothing new to report concerning the mining share business. It continues exceedingly dull. The usual progress of exploration and development is being made in all the principal working mines. On the Comstock the re-opening of the old 600 level of Gould & Curry progresses favorably, and something good is very liable to be found there before long. The water is being fast reduced in the Osborn shaft, and bottom will soon be reached, after which sinking deeper will be the proposition. The low-grade ore resources of Consolidated California and Virginia, as well as at the south end in Yellow Jacket, Kentuck, Crown Point and Belcher, are being utilized for all they are worth, or to the full extent of the milling capacities. There are no idle mills now, and more stamps could be employed to good advantage. The outlook for a prosperous mining and milling run during the coming season was never better, and most certainly the winter and spring weather thus far betokens no scarcity of water, as was the case last fall.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Lapanta, April 17, \$10,000; Hanauer, 14, \$7290; Queen of the Hills, 13, \$1269; Hanauer, 15, \$5340; Pascoe, 15, \$2020; Alice, 16, \$12,131; Fitzhugh, 16, \$6743; Hanauer, 16, \$3145; Pascoe, 16, \$2030; Queen of the Hills, 16, \$1250; Hanauer, 17, \$3445; Queen of the Hills, 17, \$1280; Wells, Fargo & Co., Salt Lake, received for week ending April 16, \$81,773 in bullion; McCormick & Co., \$37,785; T. R. Jones & Co., \$49,516; Union National Bank, \$20,845; Oro Grande, 11, \$3164; Odessa Mill, 11, \$7800; Barber's Mill, 11, \$3500; Calico Mining Co., 18, \$5000; Oro Grande Mill, 18, \$5608; Odessa Mill, 18, \$4400; Barber's Mill, 18, \$3500.

New York Metal Market.

Telegraphic advices dated April 22d give the following New York prices:

ANTIMONY—Hallet's, 8½; Cookson's, 9½; in London, £34.10.
 BORAX—Silver—Fine is quoted at \$1.07½ per ounce. BORAX—California is selling at 6½ and 7½. The action of Congress on the duty on borate materials is anxiously noted by makers. A protest against any change of tariff has been forwarded by California manufacturers.

COPPER—Lake is quoted at \$11.50@11.62½. The market is quiet, with no changes of price. Lake stocks are light and set at 15,000,000 to 18,000,000 pounds, a large part of which is sold to manufacturers. There are numerous unfilled European orders in the market.

IRON—No. 1 American, \$17@18; No. 2, \$16@16.50. Market quiet and depressed, with product increasing. The weekly capacity of furnaces in blast is about 100,000 tons of all kinds per week.

LEAD—\$4.85@4.95. Market very quiet, with heavy offerings of both common and refined. Buyers seem to expect a decline in prices and are holding off.

NICKEL—Prices are nominal—70c.
 QUICKSILVER—Quoted at 43@43½.
 TIN—Quoted at \$20.70@20.80. Prices remain about the same, though the market is dull.

MR. J. F. Daly, whose business card appears in another column is a practical expert machinist who makes a specialty of perfecting experimental machines for inventors and constructing or manufacturing complicated or fine machinery. Mr. Daly's experience in this line makes him efficient and quick of conception to devise and originate needed parts and ways to proceed. At his shop may always be seen various newly completed inventions and many others in process of being worked out. He also furnishes estimates for building all kinds of machinery in quantities, and builds and repairs machinery of all descriptions.

THE Lake Superior copper mines are said to have very little copper on hand.

OPERA glasses for the Panama at Muller's optical depot, 135 Montgomery street, x

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.								
COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co.	Nevada.	2.	50.	Mar. 4.	Apr. 8.	Apr. 23.	W. Willis.	309 Montgomery St.
Baesa Vista Petroleum Co.	California.	33.	150.	Mar. 15.	Apr. 20.	May 10.	J. Morizo.	328 Montgomery St.
Boston M Co.	California.	1.	11.	Mar. 6.	Apr. 10.	Apr. 26.	M. McDonough.	Grass Valley
Con Amador M Co.	California.	11.	100.	Apr. 7.	May 10.	May 26.	F. B. Latham.	327 Pine St.
Crocker M Co.	California.	2.	20.	Mar. 10.	Apr. 13.	May 21.	A. Waterman.	309 Montgomery St.
Champion M Co.	California.	21.	10.	Apr. 15.	May 20.	June 2.	T. Wetzel.	322 Montgomery St.
Eureka Con M Co.	Nevada.	9.	100.	Apr. 20.	May 31.	June 2.	E. H. Wilson.	326 Montgomery St.
Grand Prize M Co.	Nevada.	13.	40.	Apr. 9.	May 17.	June 7.	R. R. Grayson.	327 Pine St.
Gold Point Con M Co.	California.	9.	01.	Mar. 20.	Apr. 24.	May 15.	A. B. Brady.	Grass Valley
Gould & Curry M Co.	Nevada.	32.	05.	Apr. 5.	June 7.	July 7.	E. D. Black.	309 Montgomery St.
Lucky Hill Con M Co.	Nevada.	3.	20.	Apr. 2.	Apr. 6.	Apr. 28.	J. V. Fow.	310 Pine St.
McMillen S M Co.	Arizona.	6.	20.	Apr. 9.	May 14.	June 8.	J. Morizo.	326 Montgomery St.
Martin White M Co.	Nevada.	21.	25.	Mar. 16.	Apr. 20.	May 20.	J. J. Scoville.	309 Montgomery St.
Manhattan M Co.	California.	9.	01.	Mar. 20.	Apr. 24.	May 15.	A. B. Brady.	Grass Valley
Monitor-Belcher M Co.	Nevada.	2.	13.	Apr. 3.	May 6.	May 24.	J. J. Mitchell.	Grass Valley
North Belle Isle M Co.	Nevada.	10.	20.	Mar. 2.	Apr. 6.	Apr. 28.	J. V. Fow.	310 Pine St.
Peerless M Co.	Arizona.	7.	25.	Mar. 3.	Apr. 5.	Apr. 27.	A. Waterman.	339 Montgomery St.
Placet Con M Co.	California.	14.	01.	Mar. 2.	Apr. 3.	Apr. 22.	M. Byrne.	Grass Valley
Pennsylvania M Co.	California.	4.	01.	Mar. 22.	Apr. 24.	May 16.	M. Byrne.	Grass Valley
Potosi M Co.	Nevada.	23.	20.	Apr. 15.	May 20.	June 9.	C. E. Elliot.	309 Montgomery St.
Peer M Co.	Arizona.	5.	10.	Apr. 1.	May 10.	June 16.	A. Waterman.	339 Montgomery St.
Silver Hill M Co.	Nevada.	23.	10.	Apr. 21.	May 27.	June 16.	W. M. Dean.	309 Montgomery St.
Union Con M Co.	Nevada.	33.	25.	Apr. 19.	May 26.	June 22.	J. M. Burdington.	309 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Anglo-Mexican M Co.	Mexico.	C. A. Moore.	217 Sansome St.	Annual.	May 6
Con Imperial M Co.	Nevada.	D. L. McCoy.	329 Pine St.	Annual.	May 5
Morgan M Co.	Nevada.	C. S. Neal.	329 Montgomery St.	Annual.	May 1
Monitor-Belcher M Co.	Nevada.	H. Deas.	309 Montgomery St.	Annual.	Apr. 27
Potosi M Co.	California.	W. Cleghorn.	318 Front St.	Annual.	May 1
Ruby M Co.	California.	H. Picboir.	320 Sansome St.	Annual.	May 4
Russel Reduction Co.	California.	J. Morizo.	328 Montgomery St.	Annual.	Apr. 30
Sierra Yuba M Co.	California.	W. E. Lutz.	Merchants Exchange.	Annual.	May 4
San Jose De Gracia M Co.	Mexico.	C. Moore.	217 Sansome St.	Annual.	May 3

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
California M Co.	Nevada.	W. I. Oliver.	328 Montgomery St.	10.	Feb. 23
Con Virginia & California M Co.	Nevada.	A. W. Haven.	329 Montgomery St.	30.	Feb. 12
Derber Blue Gravel M Co.	California.	T. Wetzel.	322 Montgomery St.	25.	Mar. 9
Holmes M Co.	Nevada.	C. E. Elliot.	309 Montgomery St.	25.	Mar. 20
Mono M Co.	California.	G. W. Sessions.	359 Montgomery St.	25.	Mar. 10
Manhattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Feb. 17
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar. 15

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR. 1.	WEEK ENDING APR. 8.	WEEK ENDING APR. 15.	WEEK ENDING APR. 22.
Alpha.	10	15	61	65
Alta.	25	30	29	30
Andes.	25	25	25	25
Argentina.	1.05	1.15	1.10	1.10
Belcher.	1.05	1.15	1.10	1.10
Best & Belcher.	1.25	1.40	1.20	1.30
Bullion.	33	30	39	40
Sonoma King.	1.25	1.30	1.00	1.10
Bodie Con.	1.25	1.30	1.00	1.10
Benton.	10	10	10	10
Bodie Tunnel.	1.25	1.30	1.00	1.10
Bulwer.	2.15	2.25	2.10	2.15
California.	2.15	2.25	2.10	2.15
Challenge.	1.00	1.00	1.00	1.00
Chollara.	1.00	1.00	1.00	1.00
Confidence.	1.10	1.20	1.10	1.25
Con. Imperial.	2.15	2.25	2.10	2.15
Con. Virginia.	2.15	2.25	2.10	2.15
Con. Pacific.	1.00	1.00	1.00	1.00
Orovan Point.	1.00	1.00	1.00	1.00
Eureka Con.	1.15	1.55	1.55	2.05
Eureka Tunnel.	1.15	1.55	1.55	2.05
Exchequer.	1.15	1.10	1.10	1.15
Grand Prize.	1.05	1.10	1.10	1.15
Gould & Curry.	1.05	1.10	1.10	1.15
Cashew.	2.45	2.75	2.55	2.70
Hale & Norcross.	2.45	2.75	2.55	2.70
Holmes.	7.75	8.50	7.00	7.50
Independence.	1.00	1.00	1.00	1.00
Julia.	1.00	1.00	1.00	1.00
Justice.	1.00	1.00	1.00	1.00
Martin White.	2.30	2.80	1.90	2.30
Mono.	2.30	2.80	1.90	2.30
Mexican.	3.50	4.20	3.50	4.20
Met. Diablo.	3.50	4.20	3.50	4.20
Northern Belle.	2.00	1.15	1.15	1.15
Nevado.	2.00	1.15	1.15	1.15
North Belle Isle.	2.00	1.15	1.15	1.15
Occidental.	1.00	1.00	1.00	1.00
Ophir.	1.75	2.5	1.75	2.5
Overman.	1.25	2.0	2.0	2.5
Potosi.	1.45	1.60	1.54	1.60
Pinal Con.	1.10	1.25	1.10	1.20
Seg. Belcher.	1.10	1.20	1.10	1.20
Sierra Nevada.	1.45	1.60	1.45	1.60
Silver Hill.	1.00	1.00	1.00	1.00
Silver King.	1.00	1.00	1.00	1.00
Sorption.	1.00	1.00	1.00	1.00
Syndicate.	1.00	1.00	1.00	1.00
Toga.	1.00	1.00	1.00	1.00
Union Con.	1.35	1.40	1.40	1.45
Yuba.	1.00	1.00	1.00	1.00
Yellow Jacket.	1.70	1.80	1.70	1.80

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Apr. 22.	855 Hale & Nor.	2.65@2.70	
200 Alpha.	65c	330 Mexican.	1.01@1.2
500 Alta.	29c	110 Mono.	2.30
200 B. & Belcher.	1.15@1.2	280 Ophir.	1.72@1.75
205 Bodie Con.	1.10@1.1	300 Potosi.	1.50@1.52
200 Bulwer.	88c	90 Savage.	1.15@1.20
300 Chollar.	88c	150 Sierra Nevada.	1.41c
100 Con Va & Cal.	2.00@2.0	100 Utah.	50c
125 Confidence.	1.55	420 Union Con.	3.30c
100 Gould & Curry.	1.85	80 Yellow Jacket.	1.70@1.75

San Francisco Metal Market.

THURSDAY, April 22, 1886.	THURSDAY, April 22, 1886.
ANTIMONY—Per pound.	12 @ —
Hallet's.	12 @ —
Cookson's.	12 @ —
BORAX—San Bernardino.	— @ 64
Armagosa.	— @ 64
IRON—Glenbrook ton.	22 50 @ 21 50
Eginton, ton.	24 00 @ 23 00
American St. ton.	24 00 @ 23 00
Oregon Pig ton.	22 00 @ 21 50
Clipper Gap, Nos. 1 & 4.	22 00 @ 21 50
Clay Lane White.	22 00 @ 21 50
Bole.	15 @ —
Steel—English, lb.	15 @ —
Black Diamond, ordinary sizes.	13 @ —
Flow.	5 @ 6
Machinery.	13 @ 10
Sanders Bros.	13 @ —
COPPER—	
Braziers' sizes.	17 @ —
Fire-box sheets.	20 @ —
Bole.	17 @ —
Sheathing.	17 @ —
Ingot.	13 @ 14
LEAD—Pig.	4 75 @ 5 00
Bar.	4 @ 42
Pipe.	8 @ —
Sheet.	8 @ —
Shot, discount 10% on 500 bag.	1 85 @ —
Buck, 3/4 bag.	2 05 @ —
Ohilled, do.	2 25 @ —
ZINC—German.	9 @ 10
Sheet, 73 lb 7 to 10 lb, less the eask.	74 @ —
QUICKSILVER—By the flask.	— @ 33 00
Flask, new.	1 05 @ —
Flask, old.	8 @ —
TINPLATE—Coke.	5 15 @ 5 50
Charcoal.	5 15 @ 5 25

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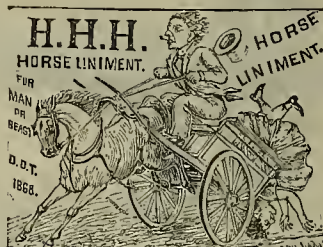


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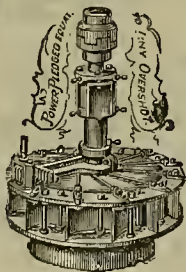
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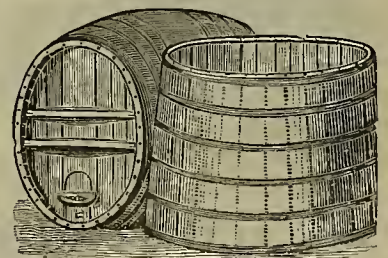
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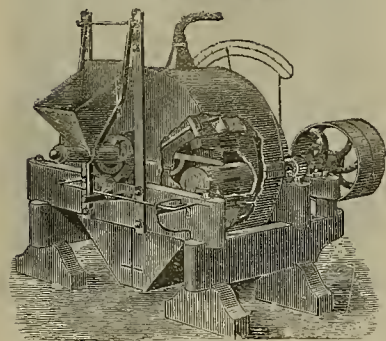
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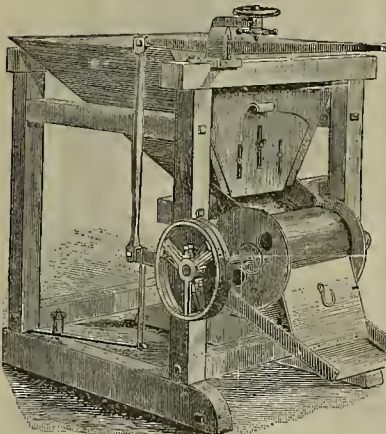
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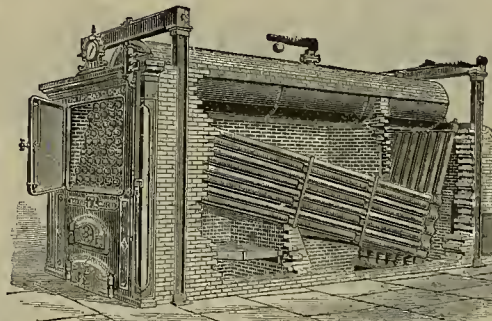
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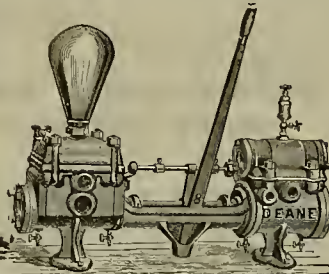
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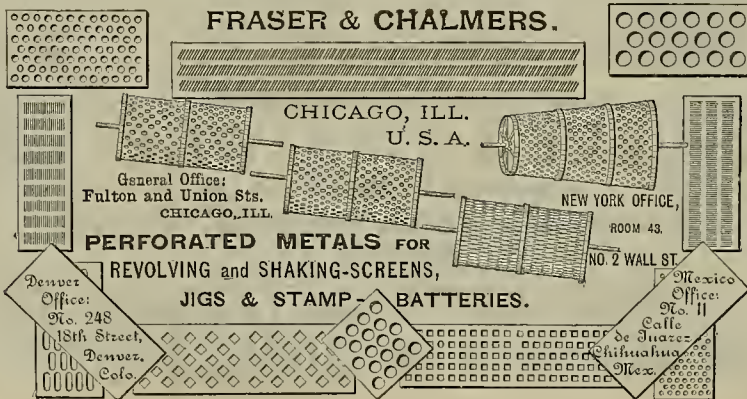
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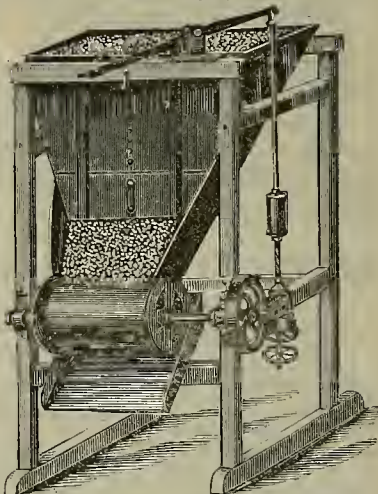
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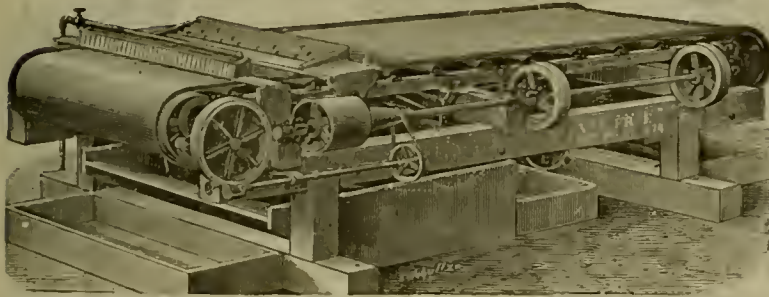
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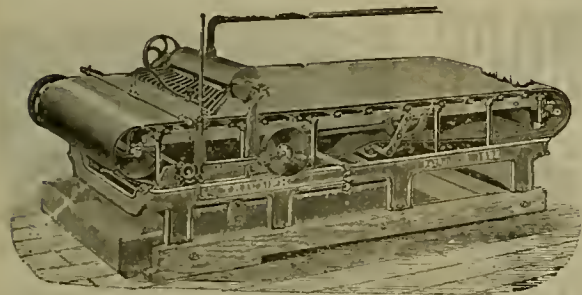
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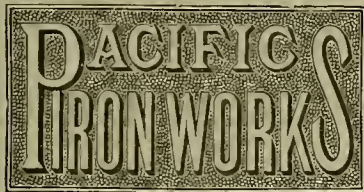
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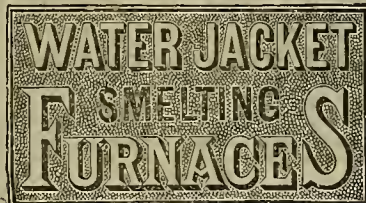
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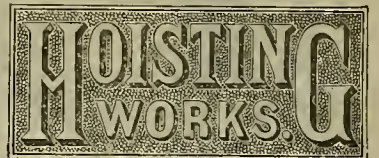
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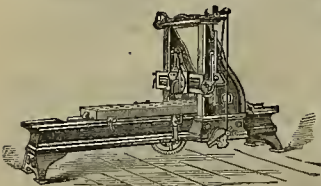
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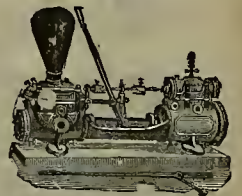
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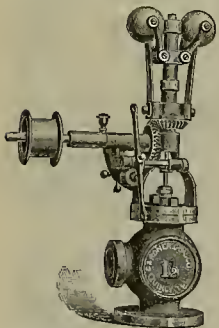
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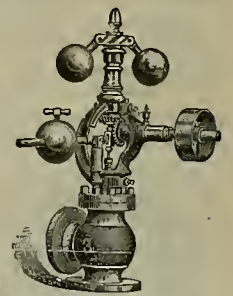
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NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, MAY 1, 1886.

VOLUME LII
Number 18.

The Waring Pulverator.

We illustrate on this page a form of ore pulverizer which employs the principle of centrifugal force in an entirely new way. It is called the "Waring Pulverator," and its general construction and operation will be understood by reference to the drawings and the following description:

The material to be pulverized, previously broken to suitable size, passes into the mill at the openings to the left of chamber, Fig. 3, an automatic feed regulating and accurately measuring the amount. As soon as it enters the hollow bearing of the rotating chamber it is thrown outward by centrifugal force, and then by plows (not shown in the drawing) is delivered within the steel ring that forms the inner periphery of this chamber; here it is speedily reduced to powder by the centrifugal force of three steel rollers, *B*, pushed in a direct path around this steel ring by three other rollers, *C*, loosely journaled to the circular carrier, *D*, (keyed to the shaft *E*), so that in pushing the crushing rollers they revolve on their own axes.

Water is admitted through the center shaft and radial passage-ways in the carrier, *d*⁴, (Figs. 1 and 3) to these axes, *c*, thus constantly lubricating them and keeping them free from gritty matter. Additional water may be admitted through the pipe *E*³.

The discharge is by means of an adjustable scoop, *M* (Figs. 2 and 3), pointing in a direction opposite to that in which the chamber rotates. The degree of fineness of product may be regulated by changing the number of rotations of the chamber and by the distance at which the discharge scoop is moved from the center of the mill. The material removed from the mill through the scoop may be discharged at either the front or back—the gangue at one side and the concentrates, when they have accumulated, at the other.

In Fig. 1 *BBB* are the crushing rollers; *CCC* the pushing rollers; *D* carrier, keyed to the main shaft; *A*⁵ steel ring; *E* main shaft; *H* retarding pulley; *H*² driving pulley.

In Fig. 2 *M* is an adjustable discharge scoop; *M*² the handle for directing the discharge to either *N* or *N*².

Fig. 3 shows the machine used for the wet process. In the *I I* are the pulleys driving the shaft and carrier *D*; *B* is the crushing roller; *C* shows pushing rollers, loosely journaled; *M* is the adjustable discharge scoop.

As the material being pulverized offers a constant resistance to the forward motion of the rollers, whatever power is required to overcome this resistance is returned to the main shaft by the belt which passes over the chamber. This, the makers claim, amounts to a saving of about one-third of the applied power.

The centrifugal force generated by the rotation of the chamber, being much greater than gravity, causes the material to be evenly held against the entire inner periphery. This not only insures a constant and uniform action of the rollers and accounts for the enormous output of the mill, but also prevents unequal wear of the ring.

The manufacturers claim that the pushing rollers do not do any crushing except of the particles which trail between them and the free rollers—an amount just sufficient to prevent metallic contact. No iron, therefore, can possibly get into the product, as the pulverizing

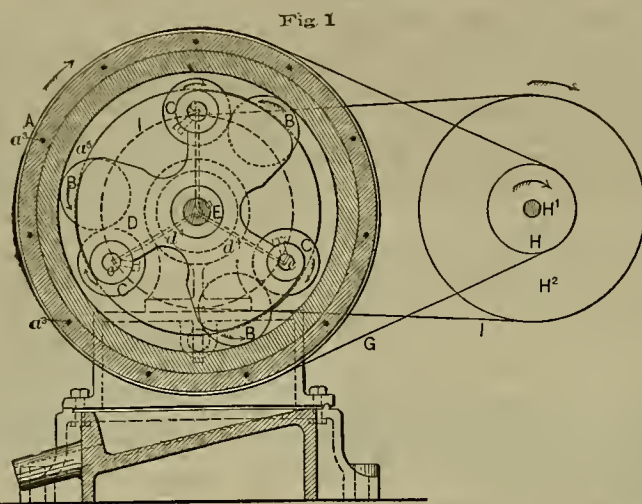


FIG. 1.—SECTION OF WARING PULVERATOR SHOWING CRUSHING AND PUSHING ROLLERS.

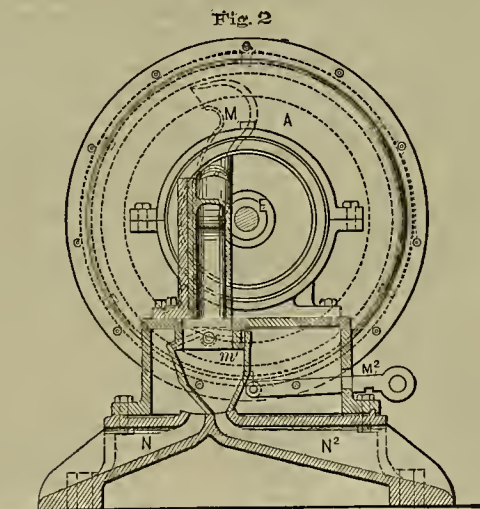


FIG. 2.—SECTION OF PULVERATOR SHOWING DISCHARGE SCOOP.

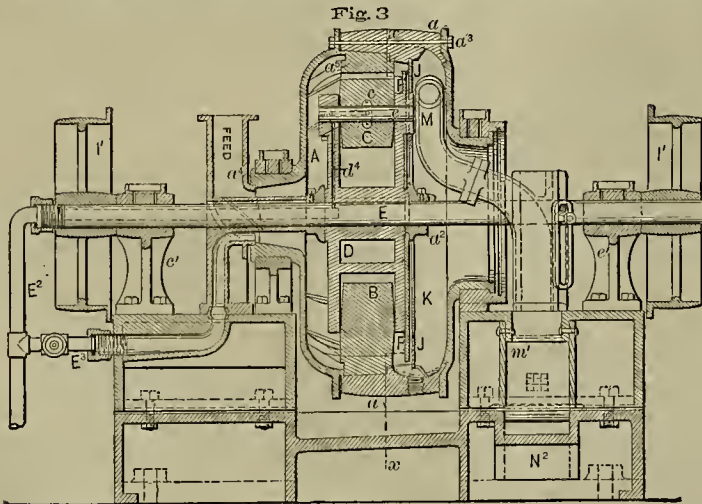


FIG. 3.—WARING PULVERATOR ARRANGED FOR WET PROCESS.

is done altogether by impact, and the tendency is for the material to become imbedded into the rollers, merely causing them, though very gradually, to spread at the surface. The steel does not wear off any more than it would if rollers weighing from 1500 to 2000 pounds (the cen-

trifugal weight of each of the free rollers in the pulverator) were made to roll over the same material on a flat surface.

The dry mill is the same in principle as the one just described, the only difference being in the discharge arrangement. An exhaust fan induces a current of air through the machine, passing into the rotating chamber around the edges of the carrier disc. The current of air, after passing into an apartment wherein the great bulk of the material is separated from it, is returned to the chamber and used over and over again, avoiding waste of the very finely pulverized material and the annoyance and inconvenience from dust. It will be noted that no screens are used in either the wet or dry process.

The pulverators, both wet and dry, are made in three sizes, having crushing surfaces of 12, 24 and 36 inches in diameter, pulverizing from 500 to 6000 pounds an hour. Ingredients of different specific gravity may be discharged separately from different sides of the mill, and the fineness of product is readily regulated. Expensive foundations are not required, and one man can attend several machines. This pulverator is the invention of J. B. Waring, 26 Church street, and is manufactured at the well known Delamater Iron Works, foot of West Thirteenth street, New York.

Altitude of Placer Mines.

The secondary nature of gravel deposits in itself implies a lower average altitude than that of quartz veins, from which they are derived, though exceptions are met with in the case of veins unrelated to the drift matter or whose croppings have been largely cut down by erosion, possibly also where the conditions have been reversed by earth movements. The placer veins generally are at an average elevation of over 3400 feet above sea level, and those of the State are above an elevation of 2400 feet. The large number of shallow alluvial placers on the foothills and on the edges of the Sacramento and San Joaquin valleys, not on the lines of ancient river channels but redeposits from the latter, are at less altitude than the average stated, while the beach sands form the lowest group. The great drifts of the ancient rivers are in places from 1500 to 2000 feet above the present drainage system.

The order of succession of the deposits in point of time as well as in altitude is, first: the original quartz veins; second: the drift accumulated in the ancient river channels; third: the shallow alluvial placers, a redeposit or second concentration from the earlier drifts. Above the zone of the ancient rivers, in places, are found deposits of wash from the quartz croppings of recent origin; and, on the other hand, below the old river beds occasional accumulations of gravel are found, which are not redeposits from the latter, but are formed from the disintegration of veins which reach the surface at less elevation than that of the ancient channels. Placers are sometimes left on the summit of hills or mountains but this is the exception, not the rule. In this State some very important deposits occur on the crests of the foothills, and in Alaska the placers are nearly all found on the tops of hills—the result of glacial action. The highest placer in this country is in Alina Township, Park County, Colorado, which is at an elevation of 10,000 feet above sea level.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Nevada.

Mines About Smoky Valleys.—Park and Ophir Canyons.—No. 9.

[From Our Special Correspondent J. B. P.]

Park and Ophir canyons lie some 45 miles southeast of Austin, across a range of mountains, on the west side of Smoky valley. These are conspicuous and promising mining camps in this part of the State.

The ten-stamp mill in Park canyon, under the management of Mr. Trueman was not in active operation when we were in the camp, but was all in trim condition to start up in a few days. Large quantities of ore are now in readiness for the stamps, and the setting of a new roaster in addition to the one already in use, would render the appointments of this mill most complete. There has been a display of much honest, economical and ingenious enterprise on the part of Mr. J. B. Trueman to transplant this mill property to this point and to work it up into its present admirable condition. The husky thrift about this camp was very pleasant to witness and the outlook is of the most hopeful nature for the future. The property is operated by a company from Oswego, N. Y., some of the officers of which are among the writer's old intimates of college days of more than 30 years since, and are filling their places most nobly in the work of life.

At Ophir canyon some eight miles further south, on this same range, we found a very lively state of affairs. On the day previous to our arrival a new and rare discovery had been made in the principal mine on the third level, about 180 feet from the surface. This consisted of a solid and uniform sheet of ore, about two and one-half feet thick that heretofore in the old working of this mine had been left as a hanging wall, which it so completely resembled in its dark granite complexion.

An Accidental Discovery.

The nature of the discovery was purely accidental, rather than intentional. A large shore put for a support against a long stretch of this hanging wall, in an extensive cut-out, where ore in former years had been removed, was seen to be loose and serving no useful purpose and was ordered to be removed. In the removal a piece of this hanging wall fell in, and on inspection was found to be freighted with silver in large proportions, running, as afterwards proved, all the way up from \$800 to \$3000 per ton. The singularity, the richness and extent of the new find was reasonably calculated to arrest the attention of the whole camp, and when we arrived, the depth of feeling and excitement was of no ordinary cast. Mr. Oliver, the foreman, exhibited some of the samples of this new find, and the sight was sufficiently impressive to convince the most casual observer of the great wealth that was ensconced in those large masses of fresh ore. On the arrival of Mr. Jackson, superintendent and quarter owner of this mine on the same evening, we were urgently solicited by him to remain over until the next day, and go down into the mine for a general inspection.

Underground.

The next day, in company with Mr. Jackson, Mr. Oliver and several others, we had the pleasure of going through quite an accurate review of the mine. On the 31 level we came upon the new discovery, which fully corresponded to the description given, and in the center of which hanging wall (some 15 feet square), a miner on his scaffold, with drill in hand, was hard at work sinking a hole, preparatory to blasting off a few tons of this magnificent sheet of mineral. The blast was set off before we left the camp, we understand, but we did not have the pleasure of inspecting a great mass of solid ore which was brought to the surface by the aid of four or five miners. The dip of this hanging wall was in accordance with the other sections of the lode, in the mine, having a bearing of about 45°. A strong force was at work on the 5th level taking out some very fine ore. In fact, this mine which in former years has yielded several millions, has manifestly entered upon a new era of activity under the present management, and is now on the threshold of one of the husiest and most productive mining seasons of any mine in the State for this year. This mine has a twenty-stamp mill in constant activity, and another of ten stamps has been purchased to be set up immediately, to crush low grade ore.

Concentration.

The pulp of this low-grade ore is to be put through the Golden Gate Concentrator, such as is now used on the Brunswick and other mills on the Carson river. This Golden Gate machine, that separates the metal without the use of quicksilver, is bound to occupy a very conspicuous place in all the mining industries of this State, hereafter. In all intelligent mining circles it is the general subject of discussion, and several delegations from this part of the State have been sent West to look up its marvelous merits, and to introduce these machines here as soon as possible.

Fuel in abundance is obtainable at Ophir and Park canyons, whilst an extensive salt marsh lies directly opposite in the valley, furnishing

an ample supply of this material for all reduction purposes. The principal proprietors of this property are a Chicago company whilst a large share of the stock is owned by parties resident upon the ground. It is intended to push forward the works here with the greatest skill and energy, and to render this one of the best paying mines of the West. Mr. Graham, an old miner, and a very careful critic of mining interests in general, and who owns himself a mill property at the Tintic mines, Western Utah, was here on a visit, in behalf of the Chicago interest in the mine, and expressed himself in very encouraging terms respecting the future outcome of this plant.

The two miles of grand canyon leading up to this mine furnishes one of the most romantic pieces of scenery to be found in all the West, and Nature appears to have, indeed, furnished a royal gateway of access to some of her equally wonderful treasures. One of the most imperative needs felt here is speedy railway communication with the outer world, and the rapid growth of this and other adjoining camps will tend to hasten the time for the speedy consummation of such facilities.

Parallel End Lines.

EDITORS PRESS:—The Placer county Republican, referring to that portion of the U. S. mining laws, Sec. 388, directing that "the end lines of each claim (lode claim) shall be parallel to each other," apprehends that the directing law is insufficient and "may occasion an absurd combination of circumstances." The editor gives an explanatory diagram as follows:



The dotted lines, extending from the adjoining corners of the representative claims, denote the locus of a possible conflict and consequently the lode or lodes of both locations must dip towards that locality, outside of their respective surface side lines.

The proposition is certainly interesting and I shall endeavor to demonstrate briefly that the law as quoted is eminently proper; in fact, a faultless requisite for the location and equitable limitation of lode claims.

The rather unusual, relative position of the two locations, owned by different parties, suggests the preliminary question, whether either or both claims are located upon the same vein; or upon intersecting veins. The United States law wisely do not recognize the old time "spurs and angles"—so it may be also asked, whether the vein of one location abuts that of the other?

Assuming that the two owners of the above claims endeavored to locate the same vein—the diversity of the respective end lines is not in accord with: "A location of a mining claim upon a lode or vein of ore, should be laid along the same lengthwise of the course of its apex at or near the surface, as well under the mining act of 1866, as under that of 1872. If located otherwise, the location will only secure so much of the lode or vein as it actually covers." And again, "Each locator is entitled to follow the dip of the lode or vein to an indefinite depth, though it carries him outside of the side lines of the location; but this right is based on the hypothesis that the side lines substantially correspond with the course of the lode or vein at the surface." (Mineral Lands, p. 335.) But it may have been caused by misleading peculiarities of surface deposits; ignorance or error of either owner; correction of error or speculative intent.

U. S. Law, Sec. 390, directs: "But their right of possession to such outside parts of such veins or ledges shall be confined to such portions thereof as lie between vertical planes drawn downward, through the end lines of their locations so continued in their own direction that such planes will intersect such exterior parts of such veins or ledges." The law is comprehensive and does not permit the subsequent locator to encroach upon the plainly conferred rights, conveyed by legally established surface lines to the prior location.

If either or both owners intended to or did locate different or intersecting vein or veins, which may or may not abut the neighbors' lode or lodes, U. S. Law, Sec. 404, would be decisive: "Where two or more veins intersect or cross each other, priority of title shall govern, and such prior location shall be entitled to all ore or mineral contained within the space of intersection; but the subsequent location shall have the right of way through the space of intersection for the purposes of the convenient working of the mine. And where two or more veins unite, the oldest or prior location shall take the vein below the point of union, including all the space of intersection."

Through the hypothesis of the diagram, variegated and intricate complications are suggested, and more so if the locations are intended to cover the same vein, but non-compliance only with the U. S. mining laws and instructions thereunder will originate possible contention. The side lines of either or both claims may be

diagonal to the course of the vein claimed, and it may occur also that the prior location even would have to yield proportional precedence again to a still prior location whose surface lines may embrace a portion of the apex of the vein in controversy. Absolute compliance with the laws and priority are evidently sufficient, however, to determine contention that can arise only through the ignorance, error or perversity of one or both owners.

The diagram also suggests considerable depth of expensive explorations before the presumed cause for dispute can be reached. The law properly directs that lode locations shall be entitled to the vein located throughout its entire depth. The end lines constitute the necessary linear boundaries. If the end lines were not prescribed to be parallel to each other, what should they be? The locator must be aware, more or less, of the dip of his vein. If the law did not confine him to end lines parallel to each other the surface lines of the prior locator would resemble likely:



The longest side line would of course indicate the dip of the vein, and depth would spread his linear boundaries indefinitely. Equity would demand at least that outside parts of the vein, the apex of which lies inside of the surface lines, should be limited by lines drawn rectangular to the direction of the parallel surface lines. Will it obviate complications apprehended through surface and lines being parallel to each other?

F. SLECHER.

Placer Co., April 20, 1886.

Hints for Lubricating.

EDITORS PRESS:—Many who buy mineral lubricating oil in quantity do not like to keep them on their premises because of fear from fire. It is not generally known that mineral oil, even in small proportion, quenches fire, and so far from causing, arrests spontaneous combustion.

There is absolutely no record of fires caused by mineral lubricating oils.

But a late quarterly report of the Associated Fire Insurance Co. of Boston mentions among the list of fires one to which I would respectfully direct the attention of the oil-consumers of the coast. It was a fire in a cotton mill, caused by the spontaneous combustion of some cotton waste which had been saturated with a compounded neat's-foot oil! This fire led to tests at the Institute of Technology as follows:

Test No. 1: Two balls cotton waste, one saturated with pure lard oil, the other with pure neat's-foot oil. In four hours the first ball became so fiery with heat that it was withdrawn; the second ball stood the heat two hours longer. At the end of this time it was literally a fire-ball.

Test No. 2: On the principle of the "survival of the fittest," the lard oil was dropped from the series of experiments and a comparison of the neat's-foot oil with an equal mixture of mineral and neat's-foot was made. In this test the pure neat's-foot acted just as it had before, flaming at about 500° Fah. At this time (viz., after six hours' exposure to the generative heat of the apparatus) the waste, saturated with mineral oil, had but slightly changed its temperature. And even at the end of seven hours it had risen only to 214° Fah.

In test No. 3 the proportion of mineral oil was decreased to only 33 per cent of the mixture. This proportion, 33 per cent of mineral oil, kept the temperature of the ball of waste down to 214° Fah. for 6½ hours, and then showed no signs of char. It was regarded as absolutely safe. But in my next I will try to show the inutility of all mixtures of animal with mineral oil, having demonstrated in this, I think, the superior resisting power to heat of mineral lubricating oil and its perfect safety.

CHARLES J. WOODBURY.

AMERICAN MACHINERY IN MEXICO.—A letter from the city of Mexico encourages great expectations on the part of American manufacturers of machinery and implements. The writer says: "Labor-saving machinery has only begun to make itself known here, and there is plenty of room in that direction for American manufacturers. There is no such hostility to labor-saving machinery as is alleged to exist by misinformed people. The planters welcome any good machine which saves labor, but the drummer system of introducing such machinery should be abandoned. For example, an agricultural concern sends an agent here, who persuades planters to buy his machines. He goes out to the hacienda, sets up the machine and then goes away. The machine, being new, perhaps does not work well, or a part breaks, and it is impossible to get a duplicate part near at hand, and the planter becomes disgusted, and refuses to buy the next time an agent comes around. Local agencies serve better, for then the planter buys new machines in confidence that he can any time get some one to show how to repair it or furnish him with

new parts. All the established agricultural implement dealers here testify to the universal desire for labor-saving implements. Mexico is a big country, with a very inadequate population. Immigration comes here only to an insignificant extent. The solution of the labor difficulty is either the coolie or the machine, and patriotic Mexicans prefer the latter."

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FLY TRAP.—J. Monroe Perry, Oakland. No. 339,685. Dated April 13, 1886. This is a cylindrical wire gauze trap, bent inwardly at the lower end to form a cone, with a narrow slit for the passage of the flies. It is hung by hooks against a window, with the opening at the lower end. Flies crawling up the window will, on reaching the inclined angular part of the network crawl up on it until they reach the opening between the two edges, and then pass into the opening of the trap. It can also be set upon a table. The patent covers certain details of construction.

COMBINED HARROW, SEEDER AND ROLLER.—Octave Grevelle, Garfield, Esmeralda Co., Nev. No. 339,763. Dated, April 13, 1886. This combined implement consists in a wheeled frame, to which is pivoted arms which carry a harrow extending transversely under the frame. On top of the frame is a seed box which communicates with suitably arranged drills. Behind the harrow and under the rear of the frame is mounted a roller. The invention further consists in the mechanism by which the rotation is imparted to the harrow, and by which it is vertically adjusted; in the mechanism by which the seeding device is regulated and by which its drills are adjusted; in peculiar mechanism of which the harrow, the drills and the roller, are all elevated, so that the machine will travel on its three wheels, and in various details of construction.

FOLDING BEDSTEAD.—B. F. Farrar, S. F. No. 339,283. Dated April 6, 1886. This is one of that class of folding or wardrobe bedsteads in which a sectional bed-frame is adapted to be folded into and extended or opened out from a head casing, and the invention consists in a novel double or changeable fulcrum-connection and limiting stops between the bed frame and the head-casing, adapting the former to be easily handled; in peculiar plates or pieces hinged to the sections of the bed-frame and to each other, and arranged in such a manner as to form the top of the device when folded as a wardrobe and to form the support or transverse leg for the bed-frame when extended; in pieces on the top-plates serving as end guards when the bed is folded and as supports when the bed is extended; in plates covering and protecting the joint of the sections of the bed-frame and various details of construction.

HARVESTERS.—L. J. Gilman, C. W. Frost and C. H. Foster, Santa Rosa, Sonoma Co. No. 339,761. Dated, April 13, 1886. This harvester or header consists in the novel construction and mounting of the draper frame or platform and its connection with the main frame, whereby it may be kept always level for any cut, high or low, its limits of motion defined and regulated, and the whole frame evenly balanced; in the novel power-transmitting connection, by which the work of the machine is divided between the two wheels in substantially equal proportions; in the novel manner of adjusting the reel and in the inclination of its cross-bars; and finally, in the means by which the speed of the reel and the draper is regulated. The general object of the invention is to provide an easy working and readily-handled header, adapted to do its work without waste of material or loss of power.

WIRE ROPE OR CABLE.—Andrew S. Hallidie, S. F., No. 334,646. Dated April 13, 1886. This invention relates to wire ropes or cables composed of strands, which strands are themselves composed of wires. The object of the invention is to diminish or avoid altogether the wear upon the wires, due to their frictional contact with sheaves or other supports, or to the internal frictional contact of the strands with each other. The invention consists, first, of a wire rope or cable composed of strands, each strand formed of wires and covered with strips of flat metal wound about the completed strand. It consists further, of a rope or cable composed of strands formed of wires, so as to form a complete and smooth cylindrical strand, said strand being covered with strips of flat metal wound thereon. It consists further in interposing a thread or wire between the coils of the flat metallic strips wound upon the strands, to prevent chafing of the edges. It will be seen that each strand has a flat covering strip, as well as the complete rope formed of the strands. A covering thus applied to a finished rope protects the outer surfaces, and by applying the flat covering to the strands Mr. Hallidie protects the entire body of the individual wires, not only from internal wear, or wear by frictional contact, but also protects them from external wear.

MECHANICAL PROGRESS.

Lightly Loaded Engines.

The question of large or small engines, in proportion to the work required of them, has been much discussed of late in technical journals. The *Industrial Review* remarks that steam users, when erecting new power plants, are not uncommonly told that if only their engines are large enough, everything will be satisfactory, and that there will be a margin of power for future extensions. As this quite often accords with their ideas, they follow this advice, and are thus doubly unfortunate, as they not only lay out a much larger amount of money than is really necessary to begin with, but pay more money continually in running the engines afterward. A sufficiency of power is, of course, the first consideration; but it cannot be too widely known among those interested in the economical use of steam, that wherever the load to be driven by an engine tolerably constant, there is one size of engine, and one only, which will give the best result. For every engine, also, there is one definite load, whether the engine be condensing, non-condensing or compound, which will give a maximum of economy in working. Any deviation from this, in either direction, either by underloading or overloading, will result in a greater consumption of steam, and consequently of fuel. Another contemporary in commenting upon the above says:

"There are two principal reasons for the conditions stated above, one being mechanical, the other thermo-dynamic. The initial friction (friction without load) of a steam engine, when in good condition and well lubricated, is a fixed quantity, proportional to the size of the engine, but independent of the load, and the friction due to the load, be the latter ever so light, will also be to a certain degree proportional to the size of the engine, hence, in a large engine, doing little work, both frictions will be large in proportion to the work. Regarding the thermo-dynamical question, a certain rate of expansion is generally fixed as the most economical for a certain engine, and a deviation from it will cause an increased consumption of steam. It is well known that either throttling or an excessive rate of expansion, which would have to be adopted for a light load, will cause excessive cylinder condensation, and this has been especially experienced in compound engines, sometimes to such an extent as to make them more wasteful than the common single cylinder engine."

Heat Without Fire.

Inventors and experimenters have been busy for several years in efforts to devise some practical method of producing heat without fire—by chemical action or by the mechanical action of friction. Such a device would be of great value for heating railroad cars, especially for the reason that many frightful accidents from the burning of cars by the heating stoves which they now carry might thereby be obviated. A contemporary says: "Of course if people could get along without fire there would be no conflagrations and no use for insurance companies. Nevertheless, underwriters will be interested in a recent invention which claims to generate heat without fire and is said to have been successfully experimented with in the Hookett mills, N. H. The inventor is Prof. Webster Willis, of the Boston Institute of Technology, and he describes his 'friction heater' as simple in construction, consisting only of an iron cylinder one foot long and one foot in diameter, having a fixed plate of hardened iron in one end and a second plate attached to a revolving shaft, and pressed lightly or tightly against the fixed plate as circumstances require. The cylinder is filled with water, the shaft revolves, and from the friction of the plates the water in an incredibly short time is heated, and by means of pipes can be carried to great distances for heating purposes. The machine has been in practical operation for some months, and it is demonstrated that a machine with thirty-six square inches of friction surface will heat a room of 10,000 cubic feet better and quicker than coal, wood or steam can do it, and absolutely without expense, save the wear of the friction plates, and the pittance for extra coal under the boiler. By this apparatus there is no danger from fire or explosion, and wherever there is waste power which can be utilized in this way the heat is obtained almost for nothing. It is claimed that a heater requiring two horse power to run it will amply heat a room containing 60,000 cubic feet, the heater costing \$100. Of course, time and further experiment will determine how useful the invention will prove practically; but there are those who now believe in it, and a company has been organized in Boston with a capital of half a million to manufacture and introduce the apparatus. For cotton mills, steam cars and a variety of other purposes the security against fire will be a great consideration in favor of the invention."

AMERICAN BOILERS FOR SWEDEN.—Sweden is about to try two American locomotive boilers, which are being built by the Jackson Manufacturing Company, Scranton, Pa. Though made to Swedish drawings, the boilers will be of essentially American design, with iron flues, steel fire-box, Richardson pop safety valves and Monitor injectors. We understand that the

two boilers are to be delivered at Gothenburg for \$3500. As the boilers are smaller, this price is probably higher than that of a boiler made of similar materials in Sweden, but is lower than a boiler fitted with copper fire-box and brass tubes. The results of this experiment with steel fire-boxes will be awaited with much interest.

Heavy Crucible Steel Castings.

The English correspondent of the *American Manufacturer* says that soft steel castings are coming more and more into favor in the English Admiralty, and at private ship-yards. It is thought by many English iron masters that steadily but surely cast steel will, and must, take the place of both iron and steel forgings for marine purposes, and the orders seem to justify the expectations.

Mechanical devices for accomplishing the current and even heavier work are being set up, especially by Messrs. Jessop & Sons, who make such castings a specialty. They are now able to produce monster steel castings up to 60 tons in weight. They have two Siemens-Jessop furnaces whose producing capacity is 30 tons; and a third is nearing completion which alone will yield 20 tons; while in the old foundry steel as heretofore is melted in pots of about 80 pounds. The principle of combination is thoroughly understood at these works, and every advantage is taken of it.

The correspondent above alluded to asks if this country is doing all that it should do in this direction, and says: "I am tempted to inquire if United States steel-masters are laying themselves out with the alacrity which the occasion seems to demand for the production of machinery and marine castings? The Sheffield men, who have spent hundreds of thousands of pounds sterling in the business, evidently believe that there is money in it."

Speaking of the recent failure of English-made hayonets the correspondent says that \$200 per ton has been paid for "hayonet steel." This was the price paid by the English Government authorities for the crucible cast steel supplied by Sheffield firms for the hayonets which under test are proving so wretchedly incapable of rough work. The figure is from \$50 to \$75 per ton less than the Government paid some 12 years ago. Still it is a figure at which a thoroughly reliable cast steel can be obtained.

SIZE OF STONES IN MASONRY.—In many edifices, both ancient and modern, it has been observed that the stones used were too thin—i. e., that they had not sufficient thickness in proportion to their length, and that in consequence they broke under the weight. This accident arose from the stones not resting equally throughout the whole surface of their beds, either because these surfaces were not exactly dressed or levelled, or because some unequal settlement took place which deranged the lower stones. The greater the thickness given to stones relative to their length, the greater is the power of resisting this effect, which is very often difficult to foresee or prevent. For works which have very great weights to carry, such as walls and points of support, cubes are the strongest, but they have less ability and do not form sufficient bond; those in which the length is much greater than the height have more bond but less strength to carry the weight. According to the experimenter's made on stone, the length may be fixed at from twice to thrice their height, and their width from once to twice, supposing the stone of moderate hardness. When stones are very hard, more than a foot thick, and wrought on all sides, their length may be from four to five times their height, and their width from two to three times. Larger dimensions increase the expense without adding to the utility.

ENGLISH AUTHORITY ON AMERICAN LOCOMOTIVES IN BRAZIL.—A letter in *Engineering* (London) states that American locomotives have of late years been rapidly gaining favor in Brazil. A few years ago we hardly had an American locomotive in Brazil. Now most of the Brazilian companies prefer the Baldwin to any other. In the Government railway, the Don Pedro II., there are 118 locomotives. Of these only 18 are English, 1 Belgian and 1 French; 98 are American. In the next largest railway line, the Leopoldina, out of 25 locomotives in traffic only 9 are not American. And yet no political or other influence of the kind has determined the preference. The agent of the Baldwin works was an obscure American commission merchant, and at present the Philadelphia house is represented in Brazil by a most respectable English firm, that of Messrs. Norton & Megaw, who also represent Messrs. Lamport & Holt, the celebrated ship owners.

NEW POLISHING DEVICE.—S. W. Adams, of Chicago, Ill., is the patentee of a machine for polishing the interior of metal tubes. The machine contains a revolving shaft carrying a polishing head or disk at one end, and used in connection with a clamp composed of a sleeve having a split end and of a nut for clamping the split end of the sleeve on the tube to be polished. The emery-head is revolved rapidly within the tube, while the latter is being gradually carried forward. The shaft and the tube are rotated in opposite directions. Hot water is supplied to the tube by a hose nozzle which is being carried forward with the tube. The inventor states that long pieces of tubing may be nicely polished by this machine.

SCIENTIFIC PROGRESS.

An Interesting Scientific Discovery.

To Prof. Osborne Reynolds is due the credit of making a discovery which promises to be of some importance. The discovery appears to have resulted from experiment, guided as much by inductive reasoning as pure curiosity. It is, says the *Engineer*, a remarkable discovery, in that it was quite unanticipated, and is, indeed, apparently opposed to past experiences. Of course, it is not really opposed, for nature does not contradict herself; but the precise conditions necessary have never before been secured properly by a philosopher, though, no doubt, they have been present scores of times when the philosopher was absent. The discovery was referred to and described at a late meeting of the British Association. More full reference was made to it at a subsequent meeting held February 12th last.

A special word had to be coined to give a name to the discovery, and it will hereafter be known as "Dilatancy." The paper read by Prof. Reynolds was entitled, "Experiments Showing Dilatancy, a Property of Granular Material, Possibly Connected with Gravitation."

The Nature of the Discovery.

If we ask anyone what will occur if an India rubber bag containing sand and water, and communicating with a bucket of water by means of a tube, be pressed between two flat boards, the answer will be that the water in the bag will be squeezed out into the bucket. Broadly stated, Professor Reynolds' discovery is that this is not what will happen, but that, on the contrary, water will at once rise up the pipe from the bucket, and enter the bag. Paradoxical as it may seem, the bag becomes larger, up to a certain limit, the more it is squeezed.

Professor Reynolds began his discourse by telling his hearers something about the mysterious ether by which light is transmitted to us from the sun; by shearing which in two, according to Dr. Lodge, we get electricity; the possible cause of cohesion and gravitation; an elastic, homogeneous jelly pervading all space, more rigid, in one sense, a million times, than cast steel, and yet so tenuous that it does not sensibly retard the motion of planets moving through it. Whenever a phenomenon presents itself which cannot be otherwise explained, it is referred to the ether, and there are nearly as many ethers as there are philosophers. It has been said, indeed, that no less than six different ethers are needed to satisfy the predicates of the vibratory theory of light. Maxwell found no comfort in the ethers; on the contrary he maintained that they were like the glasses of the dram drinker—one always led to another necessary to explain the existence of the first. "As a result," says Professor Reynolds, "of a long-continued effort to conceive a mechanical system possessing the properties assigned by Maxwell, and further, which would account for the cohesion of the molecules of matter, it became apparent that the simplest conceivable medium—a mass of rigid granules in contact with each other—would answer, not one, but all the known requirements, provided the shape and mutual fit of the grains were such that, while the grains rigidly preserved their shape, the medium should possess the apparently paradoxical or anti-sponge property of swelling in bulk as its shape was altered."

No one ever dreamed that the cubic content of sand in a sack was affected by the shape given to the sack. Yet, now that we are told all about it, we wonder that we did not see the truth before. If the grains interlock, their alteration of form must, under given conditions, augment the space occupied. For, example, if we shake or disturb a brick wall, it is evident that we increase its dimensions, because the bricks are no longer so close to each other as they were. In an ordinary mass of brickwork or masonry well bonded without mortar, the blocks fit so as to have no interstices; but if the pile be in any way distorted, interstices appear, which shows that the space occupied by the entire mass has increased, as was shown by a model. Prof. Reynolds obtained the necessary conditions by using a thin India rubber bag holding six pints. This bag he filled with clean, dry sand, such as is used for hour-glasses, served for many experiments. The bag was coupled to one leg of a mercury pressure gauge, and it was only necessary to flatten the bag to make the mercury rise seven inches in the leg next the bag; in other words, a partial vacuum was established by squeezing the bag.

Without a knowledge of the property of dilatancy, such a method of producing a vacuum would sound somewhat paradoxical. Opening the neck to allow the entrance of water, the bag at once yields to a slight pressure, changing shape, but this change at once stops when the supply is cut off, preventing further dilatation.

Professor Reynolds has, as yet, drawn but few deductions. He prefers to continue his experimental researches, and some of the results are very curious. "Putting a bag filled with sand and water between two flat boards, vertically, and slightly shaking while squeezing so as to keep the sand at its densest, while it still has a free surface, it can be pressed out until it is a broad, flat plate. It is still soft as long as it is squeezed. But the moment the pressure is removed, the elasticity of the bag tends to draw it back to its rounded form,

changing its shape, enlarging the interstices and absorbing the excess of water; this is soon gone and the bag remains a flat cake with peculiar properties. The pressures on its sides it at once yields, such pressures having nothing to overcome but the elasticity of the bag, for change of shape in that direction causes the sand to contract. To radial pressures on its rim, however, it is perfectly rigid, as such pressures tend further to dilate the sand; when placed on its edges it bears 1 cwt. without flinching. If, however, while supporting the weight it is pressed sufficiently on the sides, all strength vanishes, and it is again a rounded bag of loose sand and water." By shaking the bag into a mold, it can be made to take any shape; then, by drawing off the excess of water and closing the bag, the sand becomes perfectly rigid, and will not change its shape unless the envelope be torn; no amount of shaking will effect a change.

In this way bricks can be made of sand or fine shot full of water, and the thinnest India rubber envelope, which will stand as much pressure as ordinary bricks without change of shape; also permanent casts of figures may be taken.

When we walk along a wet beach, around each foot-print the sand is seen to change color for some distance. This is because the pressure of the foot has changed the shape of the mass under it, and the water is sucked in, drying the sand all around. It seems a paradox that instead of squeezing the water out of that portion of beach rigid under foot, it is sucked in."

Possible Useful Applications of the Discovery.

The following has been suggested as the possible useful applications of this interesting discovery: "Although Prof. Reynolds has not drawn deductions, we cannot resist calling attention to one or two which suggest themselves. May we not find here the cause of rigidity? The bag of sand is stable, because to change its form would augment its bulk. May not a bar of steel be stable for the same reason? Our readers will not be slow, we think, to see that Prof. Reynolds has left a good deal to be explained. For example, to state that a cake of sand and water is stable because a change of form would augment its dimensions, is only to reason in a circle. We naturally ask, well, why should it not increase its dimensions, and to this Prof. Reynolds supplies no answer. It is true that an increase in volume would lead to the production of a partial vacuum inside, and that in so far the pressure of the air outside would tend to promote stability; but this stability ought to be elastic or dynamic stability, not static. Concerning this, no doubt, Prof. Reynolds will have more to say. The apparatus required is extremely inexpensive, and there is no reason why a whole army of workers should not attack this subject with excellent results. Meanwhile, we may say that it has long been known to engineers that sand, unlike water, exerts under suitable conditions no lateral pressure. For example, bags of dry sand have been employed instead of wedges to carry the centering of bridges. The loads may be very heavy, yet these canvas bags will not burst. If the sand behaved like a liquid, they would be rent in a moment by a hundredth part of the load. To strike the centers it is only necessary to open a small hole in a bag, and let as much or as little sand run out as may be needed. A paper plug will suffice to stop the flow."

EFFECT OF AIR AND WATER ON METALS.—Some researches of a valuable nature have been made by a French metallurgist into the comparative oxidizability of cast iron, steel and soft iron under the influences of moist air, sea water and acidulated water. With moist air it was found that in 20 days the steel plates lost from three grammes to four grammes for every two square decimeters of surface; chrome steel rusted more and tungstated steel less than the ordinary carburized steel; cast iron lost only about half as much as the steel and spiegeleisen less than grey iron. Sea water dissolves iron rapidly and acts upon it more powerfully than on steel; most powerfully of all upon spiegeleisen. In nine days the steel plates with two square decimeters of surface lost from one gramme to two grammes, while phosphorized iron lost five grammes and spiegeleisen seven. Tempered steel was less affected than the same steel twice annealed; soft steel less than chrome steel, and tungstated steel less than the ordinary steel with the same proportion of carbon. Acidulated water dissolves cast iron much more rapidly than steel.

A NEW ORDER OF METALLIC SPECTRA.—When, in observing the spark spectra of solutions of metals of the didymium and yttrium families, the liquid itself is made the positive pole, the upper surface of the liquid becomes luminous and gives a spectrum consisting of several nebulous but sometimes brilliant bands lying between 6205 and 4765. Boissaudran could not trace this spectrum to any of the known cerite metals, and he was unable to obtain it with solutions of the yttrium compounds. It is, however, identical with the bands given by the phosphorescence of pure yttrium compounds, as observed by Crookes, in high vacuum. The direct contradiction between these observations will be made the subject of further experiments. —*Journal of Chem.*



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W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, May 1, 1886.

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Passing Events.

The era of cheap railroad fares between California and the East has been closed for the present, but while it lasted it was of benefit to this State in bringing large numbers of desirable immigrants to our shores. The southern portion of the State has derived the greatest advantage, large sales of land in that region having been made.

As etated elsewhere in the PRESS, there is now a very good demand for gold mines in California. It must be borne in mind, however, that the capitalists who desire to purchase are not in the market for prospects, but rather desire developed mines, and preferably those which are paying a profit. They seem to want the miners to get them in this condition first and then they are willing to pay pretty good prices.

The water season this year will be a very good one, as the supply will last later than usual, owing to the large storage of snow in the mountains.

Drift mining is gradually growing in favor in this State, somewhat under compulsion, it must be confessed, hydraulic mining, in all except the extreme north, being prevented.

The decision of the Supreme Court enforcing the legality of riparian rights on streams, is looked upon with much disfavor by the majority of Californians, who do not believe that the principles of water rights adapted to English conditions, are fitted for a comparatively dry country like this, where, in order to carry on irrigation and mining operations, the water must be diverted from the natural streams.

The California Gold Region.

More attention is now being paid to the development of the gold quartz interests of California than ever before. The low prices of silver, lead and copper, the working out of placer deposits, and the cessation of hydraulic mining, have combined to turn more favorable attention to our gold quartz interests. There is an increasing demand on the part of capitalists for paying gold properties, this demand, however, being mainly confined to developed mines. Our gold regions are in a country where the climate is favorable and where means of transportation of material, etc., are at hand. The country is settled, centers of supplies are near at hand, labor is plentiful, and all the conditions are favorable, for a much more rapid development of the quartz industry than they have been in the past.

The great auriferous belt of California extends from the mountains bordering the Colorado desert on the south to the Trinity mountains on the extreme north, where it terminates at the gold bluffs on the Pacific ocean beaches. The gold bearing region of California is not exclusively confined to the western slope of the Sierra Nevadas, nor can any exact line of division be drawn separating the silver-bearing districts from those which produce gold, but by far the large proportion of the gold has come, and is still being produced from the lower portion of the flanks of the Sierras. In the Coast range mountains very little has been done. The principal auriferous territory and that which comprises a large proportion of the population and the greater portion of the mineral wealth of the State, occupies the western portion of the counties of Mariposa, Calaveras, Amador, El Dorado, Placer, Yuba, Butte, Nevada, Sierra and Plumas, all of which are situated on the eastern side of the two great drainage rivers of the State, the San Joaquin and Sacramento.

Whitney states that in the extreme southern portion of this gold region beyond Mariposa county, the slates almost cease to form the continuous belt, and they are more encroached on by the granites going southward. In fact, there is a gradual decrease in the width of the auriferous formation proper from the north toward the south, and a constant increase in the amount of metamorphism displayed, the granite occupying a large portion of the mass of the Sierra, and descending lower down on its flanks, while the crest of the mountain becomes more and more elevated, its culminating points being in about the latitude of Owens lake, in Inyo county.

The quartz veins are found throughout the State, but are worked to the greatest extent in Tuolumne, Calaveras, El Dorado, Nevada and Sierra counties, on the western slope of the Sierra Nevadas. To the east of the mother lode there exists in the higher regions a belt of veins in the granite formation, which though not continuous are connected, have produced several groups of rich quartz veins, as at West Point and Sheep Ranch, in Calaveras county, Confidence and Enterprise, in Tuolumne, and Volcano, in Amador. In the Bodie district, Mono county, is a group of veins which have produced largely. There are several comparatively isolated groups of mines which have been worked for years. The center of the gold quartz industry remains, as has been the case for years, in Nevada county.

Of late years the general results that have attended the business of quartz mining in this State have been satisfactory. Notable progress has been achieved under the stimulus of capital. Work in many new mines has been commenced and old ones have been worked with more energy. Important economies have been perfected, bringing the business within more fixed and scientific principles. Moreover, with increase of depth, has come increase of richness, and some of our very best mines are our deepest ones.

The Anaconda company, M. T., according to the Review, is getting tired of the high prices paid for Rock Springs coal and will, it is rumored, use coal for mines along the Northern Pacific as soon as the Northern Pacific reaches the town of Anaconda.

The Victor mine has been sold to the English company which recently erected a 30 stamp mill at Candelaria, Nevada. It is expected that the sale will place the camp on its old prosperous footing.

Mining and Milling in California.

It is a noteworthy fact that among those gold quartz mines which have been longest worked in California, are those which are to-day the most profitable, and also that our very deep gold mines—the deepest in the world—are still paying large profits. These facts argue well for a continuance of gold quartz mining in this State, and show that this class of property furnishes as good investment for capital as can be desired.

It is not necessarily the richest ore per ton that brings the largest profit in the end. Low-grade ore in large quantities pays well in this State, when properly worked. For instance, the Plumas-Eureka and Sierra Butte mines may be considered typical low-grade quartz mines, as manifested by their production, the magnitude of their operations, and their permanence both in depth and length. These mines have been continuously worked with profit for over 30 years. They are over 7000 feet above sea level; they have water power for milling, and their wide veins are opened by tunnels on the mountain side. It will be interesting to show, as can be done from the Mint Director's statistics, what it costs to work this ore.

In the Plumas-Eureka mine, Plumas county, where the company own their own 60-stamp mill, the following record of operations for a year may be noted:

MINES.	
Average number of miners.....	per day 225
Miner's wages.....	per month \$65.00
Mining (including dead work).....	per ton 3.52
Milling.....	per ton 0.494
Amount extracted and worked in year.....	tons 55,783
Average yield.....	per ton \$8.72
Sulphurets.....	per cent 1

MILL.	
No. of stamps.....	60
Weight in pounds.....	750
Drop per inch.....	84
Drops per minute.....	80-85
Capacity per 24 hours (tons).....	153
Cost of treatment per ton.....	\$9.494
Crushed in year (tons).....	55,768

Both water and steam power are used. The method of treating sulphurets is by roasting, grinding and amalgamating. The cost of mining includes the sinking of two shafts below tunnel level, one engine and pump in each shaft run by compressed air and steam carried in from surface in 3½-inch pipe, one shaft being situated 3500 feet from mouth of tunnel, and the other 5000 feet. Cost of mining also includes cost of management.

The Sierra Buttes mine has one of the best appointed mills in the State; all the machinery is run by water power. For the 14 years ending in December, 1884, \$2,000,000 had been expended on the mine, and during that time it paid dividends of \$1,360,288 with no assessments. The ore is low grade, but there are immense quantities of it. The following statement shows some details of interest:

MINE.	
Average number of miners per day.....	285
Miner's wages.....	per month \$85
Mining, including dead work.....	per ton \$4.37
Milling.....	per ton \$0.53
Amount extracted and worked.....	tons 47,616
Average yield.....	per ton \$8.18
Sulphurets.....	per cent 1

MILL.	
No. of stamps.....	90
Weight in pounds.....	750
Drop in inches.....	74
Drops per minute.....	84
Capacity in 24 hours.....	tons 70
Cost of treatment.....	per ton \$9.53
Crushed during year.....	tons 47,581

This is a water-power mill, and the sulphurets saved in Frue concentrators, are roasted, ground and amalgamated. The cost of mining includes between 70 and 80 cents per ton; cost of management and office expenses is included. During the period covered by these statistics, for three months fifty stamps were running, for three months 70 stamps, and for the other six months 90 stamps were at work.

These are both low grade mines, but are very profitable. Now let us take a higher grade mine, and take the figures for the same year as those given for the other mines. The Idaho, at Grass Valley, Nevada county, which produced \$364,599 in 1883, and paid \$34,100 in dividends; and produced \$561,895 in 1884, with \$271,250 in dividends.

MINE.	
Average number of miners.....	159
Miner's wages, per day.....	\$3.00
Sinking, per foot, depth 1,100 and 1,200 ft. levels.....	\$25 to \$32
Drafting, per foot, lower levels.....	\$9.00
Mining and milling.....	per ton \$7.86
Tons extracted in year.....	31,143
Average yield per ton.....	\$18.04
Percentage of sulphurets.....	1
Total bullion product.....	\$550,061

MILL.	
No. of stamps.....	35
Weight of stamps (lbs.).....	850

Drop in inches.....	94
Drops per minute.....	72
Cost of mill.....	\$40,000
Capacity in 24 hours (tons).....	100
Tons milled in year.....	\$1,143

In this statement the costs of mining and milling are not segregated.

Of course these three large mines cited are well equipped and outfitted and there has been plenty of money for all things necessary. But they are old mines and deep ones and ought to serve as examples to gold miners to prove that gold mining pays with depth and that \$100 per ton rock is not the only thing to look for. There are many other mines in this State with good futures before them which are just beginning to pay, like the Alaska, Young America, Delhi, and hundreds of others that might be named.

Practical Hydraulics.

This week we publish the concluding article of this series on "Practical Hydraulics" by P. M. Randall, and give his preface to the forthcoming work, as summarizing its contents. A perusal of this preface will show to those who have not followed the details from week to week, what a valuable work of reference is now available. Instead of having to work out elaborate formulae and abstruse calculations, the miner or irrigator can, by this carefully calculated tables given, find out for himself, the answer to almost any hydraulic problem. It will require no technical knowledge to do this, the rules and table simplifying this process. In order, however, to demonstrate the principles of each department, Mr. Randall has, of course, been compelled to use higher mathematics more or less; but in each case, it will be found he has also prepared simple tables and rules which will relieve the ordinary user of water from going into any elaborate calculations.

A work of this character is one which every user of water—millman, miner, irrigator, or engineer—should have at his hand. It is a work of ready reference, adapted largely to the unskilled, but also to the expert hydraulician. The rules and formulae ordinarily laid down in the common run of books are abstruse, and adapted only for engineers. Moreover, they do not have the scope or accuracy desired for the special conditions prevailing on this coast.

Mr. Randall is an old pioneer, and knows and realizes the wants of the people here. His long experience among us has given him a knowledge of our necessities, and he has put into his book just such things as are demanded for our every-day work. An accomplished and practical hydraulician, he recognizes the fact that most people have not the time or skill to go into abstruse mathematical calculations, and hence his many carefully-prepared rules and tables, each representing a vast amount of calculation and verification. No such work as this has heretofore been attempted. Writers have generally contented themselves with a few examples on the various branches, leaving the reader to work out his own results from the formula. But here in Mr. Randall's book, we have the results given in tabular form, to cover every possible case, with all the conditions expressed.

"Practical Hydraulics," in convenient book form, will be ready for delivery in a few days, by the publishers, Dewey & Co. 252 Market street, S. F.

THE Bannock Mining Co. who own the Horn Silver mine at Era, Idaho, have closed a contract with Fraser & Chalmers of Chicago, for a complete twenty-stamp silver mill with power for forty stamps, in order that it may be increased to that number whenever the company deem best to do so. The mill is to be completed by the last of September or the first of October. J. K. Owens will have charge of the construction of this mill. He erected the General Custer, the Sawtooth and the Vienna mills in Idaho. This mill will cost in the neighborhood of \$65,000. John A. Groesbeck, president of the Bannock company, says they propose to have the mill as perfect as possible to do the work they require.

In Denver, Colorado, during 1885, the largest sum paid out for labor in any one class of manufacture, was that by the foundry and machine shops, \$237,062. The newspapers came next, having paid their employees in 1885 the sum of \$227,982. It costs money to run newspapers, as well as foundries.

Chrome.

There is more going on at present in chrome mining in this State than ever before, an impetus having been given to the business by the low freight rates by rail admitting of shipments being made to the East at remunerative prices. California is one of the two important districts of the United States in chrome mining, the other being on the borders of Maryland and Pennsylvania and running into both States. It is found in irregular deposits also in several widely separated districts in the United States, usually in serpentine rock. The Eastern mines of Maryland and Pennsylvania are now practically abandoned, all the ore now coming from the deposits in this State. It is mined here in Del Norte, Sonoma, San Luis Obispo and Placer counties, and lately in Alameda county. The last three mentioned now furnish the bulk of the ore. It has been found, however, in half the counties of the State, and California has been shipping about 3000 tons per year to the East, though this year it is probable this amount will be largely exceeded. Placer and San Luis Obispo have been the largest shippers until within the past few months, but now Alameda county has come to the front with its deposits near Livermore and is doing a large business in mining and shipping. Nearly all the ore goes to Baltimore, but a small amount is exported abroad.

The chrome miner labors under one disadvantage, however; the deposit may give out at any time. The deposits are not found in veins or leads, from the direction of which new leads can be predicted, but in isolated pockets or deposits of all sizes, some times yielding only a few pounds and sometimes many thousand tons. The miner is never sure but that the next day may find his deposit exhausted or the quality of the ore no longer profitable. The only rule that has been found—and that is a discouraging one—is that the ore is richest at the surface and decreases in value as the mine becomes deeper. The value of a mine decreases very rapidly with the depth; for, in addition to the cost of getting ore to the surface and of keeping out the water from the mine, the ore is apt to contain less chromium. It is for this reason that the Eastern mines are not worked. They are not exhausted, but the mines in this State are newer, nearer the surface and therefore richer. As the cost of grinding and decomposing the ore is the same for rich as for poor grades, the rich ore is of course more profitable; moreover, the higher the percentage in the ore the easier is its decomposition.

The general results of over 100 analyses of ore found in California may be given as follows:

Locality.	Per Cent Chrome Oxide.
Del Norte county.....	39 to 40
Napa county.....	42 to 46
Placer county.....	35 to 55
Tuolumne county.....	41 to 45
San Luis Obispo.....	33 to 60
El Dorado county.....	20

One advantage possessed by the owners of the new mines in Alameda county is their nearness to shipping points. Tunnels have been run in for short depths to take out the ore and as soon as the pocket is exhausted the tunnel is abandoned. The land in which the greater part of the chrome belt at Livermore is situated belongs to A. Mendenhall, who has a homestead entry upon it. The ore was first noticed three years ago. The right to prospect and mine is given to anyone for \$1 per ton. This includes, of course, the discovery and opening up of a mine. The price is excellent, providing you strike it—but if not you have your labor for your pains. One man opened up two tunnels and took out but seven tons of chrome in a month. Messrs.

Ditman and Tickel, the owners of the two successful mines, employ two and three men respectively, and take out from eight to fourteen tons a day from each. The haulers receive \$3 per ton. They use four-horse teams and haul from two to two and a-half tons to the load, making one round trip a day. This gives from \$6 to \$7.50 per day per team.

The following from the Livermore Herald gives some additional facts on the subject: "The Cedar mountain chrome district is of considerable extent, covering, we should judge, several hundred acres. The soil is a yellowish-red color, with occasional loam deposits, and shows the action of fire. Float serpentine and chrome rock, upon which chemical action has brought out a bright green or yellow slime, which soon fades upon exposure to the air, may be found nearly anywhere, but a few inches beneath the surface. There are very few croppings, and the quest for chrome bodies is very nearly a blind search. That there are, however, large numbers of chrome pockets scattered over the district there is no reasonable doubt, and such being the fact, that the majority will in time be unearthed is without question. There are a number of prospects which would be worked at once, should the present mine run out of ore.

Half a mile nearer Livermore than his father and brother's mine, Douglas Mendenhall has

cret canyon district, Nevada, built a fire in his forge to sharpen some tools, when a dynamite cap, which had got into the fire by means which cannot be explained, exploded. The result to Laoli is a badly scratched face and impaired eyesight, the use of his left eye for the present being lost to him.

A narrow escape from a serious accident occurred at the Zeile mine, Amador county, last week. As the water bucket full of water was being hauled up, when near the surface the rope broke. The bucket fell two feet when it struck the center brace, and lodged there. There were two men at work at the bottom of the shaft at the time, and if the bucket had not so fortunately caught on the center brace, a serious accident must have resulted.

Laying Submarine Tunnels and Tubes.

At a recent meeting of the American Institute of Mining Engineers, Richard P. Rothwell, of New York, called the attention of the institute to a device which consists of a water-tight caisson, connected by a stuffing-box with the tube to be laid, and the caisson is pushed forward with hydraulic jacks set against the end of the tube. The tube is of hard, white iron, cast in chills in segments. These segments are carried from shore through the tube itself, in

vary with the local conditions, it is evident that a tunnel of this kind could in most cases be laid at a small part of the cost of an ordinary tunnel. The iron segments may be cast at the furnace, and would, therefore, cost little more than pig-iron, and the operation of putting the segments together is simple and inexpensive. The tube would generally be lined with concrete or beton lining, which would help to load it and would protect the iron from the effect of corroding gases. White cast-iron is very slightly acted upon by sea water.

My own professional interest in this improvement was first engaged by the fact that I had devised a somewhat similar contrivance for sinking a shaft in Pennsylvania about fifteen years ago. I used a solid sinking frame of 12-inch timbers, with a bevel iron shoe on the bottom, and into this sinking-frame a number of hydraulic jacks were let, so that when the ram was down the head of the jack rose only a little above the top of the frame. The sinking-frame was pushed down, as the gravel and clay were removed, by jacking from the permanent lining of the shaft, which was also composed of 12-inch timbers. Heavy plate-iron bolted to the outside of the sinking-frame lapped over at least two timbers of the permanent lining, and being pressed tightly against these, prevented the gravel, sand, etc., from entering the shaft

between the sinking-frame and the shaft-lining.

The method of sinking was found extremely convenient; the movement of the sinking-frame was under perfect control, the parties who used it found no drawback to it, though the frame was 75 feet long over all and 12 or 13 feet wide, the shaft being intended to have four hoistways, a pumpway and a manway. When the sinking-frame had been pushed a sufficient distance down from the permanent lining, the jacks were lowered, a few at a time, and an additional timber of the lining was slipped in and formed a new base from which to push with the jacks.

From the experience in that case, as well as from the simplicity of the problem, it appears to me possible to apply this new

method of tunnel-laying without serious difficulty, and with great economy where the local conditions are favorable. And there are many cases where the question of grade, the nature of the bottom, and other conditions render the construction of a tunnel in the ordinary way impracticable or enormously expensive. This new system offers such striking advantages in such cases, as well as for laying water pipes out into lakes, that it cannot fail to interest engineers.

The profit derived by the English company from its purchase of the Drum Lummon mine, Montana, has encouraged other English capitalists to make an investment in the same vicinity. The new company is called the Empire mining company, with \$500,000 capital. It has just secured from Cotter & Hickey two mines, the Empire and Whippoorwill, not far from the Drum Lummon, paying \$60,000 for them.

At Eureka, Nevada, last week, two shifts of men were put to work to excavate a foundation in the Eureka Con. hoisting works for the new engine in course of construction, parts of which are expected to arrive from San Francisco during the next three weeks.

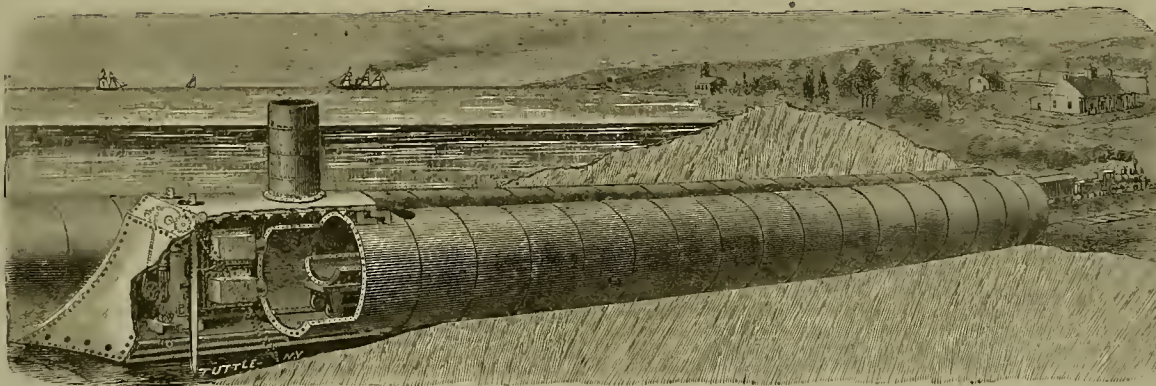
PREPARATIONS are in progress for working the placer deposits in the vicinity of Tascara, Nevada, by the hydraulic process.

THE owners of the low grade mines feel anything but happy over the result of the silver fight in Congress.

FIG. 1.



FIG. 2.



A NEW METHOD OF LAYING SUBMARINE TUNNELS AND TUBES.

recently discovered a chrome prospect, and after taking into partnership his cousin Oswald, of this place, begun work. A house has been built and the mine will be opened up at once.

The future of this industry may be easily outlined. The demand for the ore is practically without limit. Messrs. Pitcher and Knight will buy at \$6 a ton all marketable ore which is delivered to them, and they expect to average from 100 to 200 tons a week this coming summer. As to the extent of the deposits, nothing but careful prospecting will absolutely determine, but enough has already been seen to convince those who examined into the matter that the entire ore belt is underlaid with ore pockets, which will be discovered and opened up from time to time for many years.

Mining Accidents.

C. C. O'Connell was killed last week by a blast in the Holmes mine, Candelana, Nevada. He, with three partners, had put in three blasts in a winze on the first level, and went to the level to await their firing. One went off, and O'Connell, in opposition to the advice of his partners, went down to see why the others had not gone off. When he reached the hole the blast went off, crushing his head terribly. A jury returned a verdict to the effect that death was caused by carelessness in going to the hole without allowing sufficient time to elapse after firing the holes.

Joe Laoli, who is mining on Bassey Hill, Se-

which a track is laid as the work progresses, and the segments are bolted together in the caisson, where there is ample room to work and proper appliances for handling heavy weights. As each segment is bolted on, the jacks are set against its forward end, and when the whole ring is complete, the caisson is pushed forward by the jacks, a trench having been dredged out in front of it, or, in very loose ground, jets of water under a heavy pressure can be thrown out to loosen the ground in front of the caisson. The direction in which the caisson is pushed is completely under control, and both the caisson and the tube are loaded to the amount necessary to overcome their buoyancy.

Mr. Rothwell said: I understand that negotiations are now under way for the construction of a 16-foot tunnel of this kind across the straits of Northumberland, between Prince Edward Island and the main land, and for tunnels in several other places. One of the most interesting uses of this system is in laying water mains out into lakes. The work can be carried on without interruption from storms, etc., and when the desired distance has been reached the caisson can be converted into a filter, which can be easily cleaned from time to time.

The accompanying illustrations show the general design of this novel and ingenious method of laying tubes, both for railroad and water-work purposes. Full particulars and estimates are furnished by the patentee, Mr. H. H. Hall, No. 95 Liberty street, New York; but, without entering into these details, which necessarily

PRACTICAL HYDRAULICS.*

NUMBER 28. COPYRIGHTED.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

FLOOD-FLOW OF STREAMS.

Various formulæ have been devised for the flow of streams in times of floods. These empirical formulæ are, at best, but rough approximates to the true flow.

The following formula, given by Fanning, is an expression for the "recorded flood measurement of American streams" in New England and the Middle States:

$$Q = 200 M^{\frac{5}{8}}, \quad (287)$$

in which Q denotes the number of cubic feet discharge per second, and M the area of water shed in square miles.

As California is more mountainous than New England and the Middle States, and fully as subject to heavy downfall of rain in the mountainous regions, it is not improbable that the flood discharge here will exceed that indicated by formula (287). Let it hence be accepted until otherwise determined.

Ex. 119.—The water-shed of the main Sacramento river contains twenty-four thousand seven hundred and eight square miles. What will be its flood discharge per second?

$$\text{Cal.}—(24,708)^{\frac{5}{8}} \times 200 = 915647 \text{ cubic feet.}—\text{Ans.}$$

TABLE 32.

Miscellanies.

1 cubic foot of distilled water (U. S. standard), barometer 30 inches, 39.83° Fahr.=62.3793 lbs.

1 cubic foot of distilled water (British standard), barometer 30 inches, 62° Fahr.=62.321 lbs.

1 cubic foot of distilled water (U. S. standard)=7.48052 gallons.

1 cubic inch of distilled water (U. S. standard)=0.0361 lbs.

1 gallon (U. S. standard)=231 cubic inches=0.133681 cubic feet=8.3389 pounds water.

1 gallon, imperial (British standard)=277.123 cubic inches=0.160372 cubic feet=10 lbs. water.

1 gallon (N. Y. statute measure), barometer 30 inches, 39.83° Fahr.=221.184 cubic inches=8 lbs. water.

1 pound avoirdupois=16 ounces=7000 grains (U. S. standard)=27.7015 cubic inches.

1 pound Troy=1 pound apothecary=12 ounces=5760 grains.

1 ounce avoirdupois=437.5 grains.

1 ounce Troy=1 ounce apothecary=480 grains.

1 chain=100 links=4 rods=66 feet=792 inches.

80 chains=1 statute mile=320 rods=1760 yards=5280 feet=63,360 inches.

1 geographical, nautical or sea-mile=6,086.5 feet in longitude; and 6,076.5 feet in latitude.

1 league (English)=3 nautical miles.

1 metre=3.2808992=3.281 in practice.

1 square metre=1 centiare=10.7643 square feet.

1 are=100 square metres=1076.43 square feet.

1 cubic metre=1 stère=35.3166 cubic feet.

1 vara=2.75 feet.

1 legua (Mexican)=5000 varas linear=13,750 feet=2.60417 miles.

100 vara lot=100 varas square=75625. square feet=1.73611 acres.

1 legua, Mexican (of land)=6.7817 square miles=4340, 27778 acres.

1 acre=4 roods=10 square chains=160 square rods=43560 square feet.

1 section=1 square mile=640 acres.

1 township=36 sections=36 miles square=36 square miles.

1 cubic yard=27 cubic feet=16,656 cubic inches.

1 hundredweight (British)=8 stone=112 pounds.

1 ton (long ton), commercial=20 hundredweight=2240 pounds.

1 ton (short ton), U. S.=2000 pounds.

1 quintal=100 pounds.

1 fathom=6 feet; 1 cable length=120 fathoms.

1 point= $\frac{1}{16}$ of an inch.

1 line=6 points= $\frac{1}{32}$ of an inch.

12 inches=1 foot; 3 feet=1 yard.

5½ yards=1 rod.

1 foot board measure=1 foot square and 1 inch thick.

12 feet board measure=1 cubic foot.

1 foot-pound=work required to raise one pound vertically one foot.

1 second foot-pound=work required to raise one pound vertically one foot in one second of time.

1 minute foot-pound=work required to raise one pound vertically one foot in one minute.

1 horse-power (H. P.)=550 second foot-pounds=33000 minute foot-pounds.

Freezing point of water, barometer 30 inches=32° above zero (0°), Fahrenheit scale.

Freezing point of water, barometer 30 inches=zero (0°), centigrade scale.

Boiling point of water, barometer 30 inches=212° above zero (0°), Fahrenheit scale.

Boiling point of water, barometer 30 inches=100° above zero (0°), centigrade scale.

1° (one degree), centigrade=1.8° (degrees), Fahrenheit.

1 barometric inch=column of mercury, with one square inch base and one inch high.

Atmospheric pressure per square inch=14.7 pounds=30 barometric inches nearly, at 39.83° Fahr.

1 ounce Troy, gold, 1000 fine=\$20.6718.

1 ounce Troy, gold coin, U. S., 900 fine=\$18.6046.

1 pound avoirdupois, gold coin, U. S., 900 fine=\$271.375.

1 ounce Troy, silver, 1000 fine=\$1.29293.

1 ounce Troy, silver, U. S., 900 fine,\$1.163636.

1 pound avoirdupois, silver coin, U. S., 900 fine=\$16.96969.

1 dollar, U. S. gold coin=23.22 grains gold+2.58 grains copper=25.8 grains.

1 dollar, U. S. silver coin=371.25 grains silver+41.25 grains copper=412.5 grains.

1 pound sterling=1 sovereign=113.001 grains gold+10.273 grains copper=123.274 grains weight, fineness 22 carats=916.6667.

1 grain gold, 1000 fine=\$.0430663 mint value.

1 grain silver, 1000 fine=\$.0026936 mint value.

1 gramme gold, 1000 fine=\$.6646142 mint value.

1 gramme silver, 1000 fine=\$.0415686 mint value.

1 cubic foot air=.0806726 pounds=564.7082 gr's.

1 pound of air at 39.83°=12.387 cubic feet by volume.

1 cubic foot hydrogen=.005042 pounds=35.2743 grains.

25 cubic feet of sand=1 ton.

18 cubic feet of earth=1 ton.

17 cubic feet of clay=1 ton.

13 cubic feet of quartz, unbroken in lode=1 ton.

18 cubic feet of gravel or earth, before digging=27 cubic feet when dug.

20 cubic feet of quartz, broken (of ordinary fineness coming from the lode)=1 ton, contract measurement.

FINIS.

PREFACE.

The present work is designed as a true exposition of the principles and application of those branches of hydraulics, of which it treats.

The necessity of such a work at this time will be obvious to those who shall have compared the results deduced from the formulas of nearly all our most noted authors on hydraulics, with the results of observation. Thus, the formulas of DuBuat, Eytelwein, Girard, Prony, D'Aubuisson, Neville, Leslie, Pole, Beardmore and Hagen, enjoying the reputation of standard authors, give as by the data at hand, with respect to the flow of water in open streams of medium size, results varying from fifteen to one hundred and twenty-five per cent in excess of the observed results, and in large streams, results varying from thirty to sixty-seven per cent below those observed. These errors are radical. The defectiveness of these and other works heretofore regarded standard on this highly important branch of hydraulics, is well portrayed by the following extracts from an article in an English periodical, "Engineering" of Dec. 31, 1875, entitled "Hydraulic Experiments," viz:

"The tabulated velocities (in Neville's work, based upon DuBuat) 'though expressed in hundredths of an inch, are in reality but the wildest guesses at the actual velocities in irrigation canals of ordinary dimensions. Colonel Cantley relied upon DuBuat when 'be laid out the Ganges Canal, and found him but a rotten reed,

"for the water in every instance tore along at an unexpected velocity, and the erosion of the bed and destruction of the works followed in its wake. Du Buat then must be put upon the top shelf of the book-case, and it will be just as well when the steps are there to carry up every English work, in which the names of Branning, Girard, Bossut, Prony, Eytelwein, or D'Aubuisson are continually recurring as authorities against whom no action can be taken. In this general clearance Beardmore, Downing, Box, and almost every other hydraulic text book compiled by Englishmen, will with more or less hesitation have been shelved."

Again, "in 1880," says L. D. A. Jackson, in his Hydraulic Manual "the extensive experiments of Captain Allan Cunningham on the Ganges Canal, have substantiated the truth of Kutter's laws when applied to very large canals, and dealt the final blow to the 'velocity formulas of all the older hydraulicians.'"

In the main text of the present work it is stated that D'Arcy in 1835, and Bazin, in 1865, published formulas better adapted than any preceding for finding the flow of water in open streams and pipes of medium size; that Humphreys and Abbot published in 1861, formulas suited to the determination of flow of large streams, but not to the flow of small streams, and that the wide gap between the formulas of D'Arcy and Bazin, and those of Humphreys and Abbot were effectually closed up in 1870 by the introduction of Kutter's formula. We will now add, that this achievement with respect to hydraulic science seems to us the masterpiece of the nineteenth century. The Kutter formula applies equally well to small, medium sized and large streams. Farther experiments may perchance require it to be somewhat modified; but so far as known at present, of all the formulas deduced for like purposes, it seems the nearest approximate to perfection.

The principal tables computed by Herr Kutter, from his formula under consideration, give the coefficients of velocity in terms of metrical measures, thereby rendering their application a laborious task in the determination of the velocities themselves in terms of feet measures.

To obviate this task, Table 27 in the present work has been computed from the same formula (Kutter's) giving in terms of feet measures, the velocities of flow in open streams, differing in regimens and in slope, and varying from the size of a small ditch to that of the Mississippi River. The table is nominally for open streams, but is equally well adapted for determining the flow of water in pipes. Table 17 computed for the flow in pipes only, will, for this purpose, be found, however, still more convenient. For this table we are indebted in part to J. T. Fanning's very admirable treatise on "Water Supply Engineering," which indebtedness we hereby respectfully acknowledge. It will be noted however that we have not only considerably enlarged the original table of Mr. Fanning, but, among other things, conferred upon it a new and valuable feature—that of giving the quantity of flow in addition to the velocity. Each result set down in Tables 17 and 27, represents essentially a mean of numerous observed results: hence must necessarily coincide in practice with other results obtained under like conditions. With respect to accuracy, scope of application and ease of reference, these tables seem to meet more fully the requirements of all concerned in this branch of hydraulic engineering, than any others designed for similar purposes.

Tables 28 and 29 will be found very important auxiliaries to Table 27, in the ready determination of the flow of water in beds of different forms.

Tables, two relating to the flow of water in rectangular weirs, four to quadrant weirs, seven to the flow through rectangular orifices, and eight to the different values of the so-called "miner's inch," will also be found of no little value in practice. The simplicity of this quadrant weir, its cheapness and the assurances by Prof. Thompson of its superiority over those of different forms, induced the author of the work in hand to compute Table 4.

This form seems peculiarly well adapted to the measurement of the flow of small quantities of water; for example, from two to 20 miner's inches. This table, however, greatly exceeds these limits. The discussion of the subjects of "maximum work effected by water on issuing under pressure from pipes," and of "minimum weight and consequent minimum cost of an inverted siphon," is, so far as the author is informed, new. By the application of the principles here demonstrated, the greatest economy, the only proper limit or standard of the truly practical, is attained.

The simple plan, pursued in the preparation of the present work consists:—

1st. In demonstrating concisely the principle, or principles, involved in the subject matter, yet in a manner sufficiently ample and clear to be readily followed by the student, or by the practitioner desiring to refresh his mind, or to assure himself of the correctness of the results.

2nd. In expressing in words the simplest rule or rules corresponding to the formula or result of such demonstration.

3d. In applying the rule or rules so derived, to practical examples with full and clear explanations; or in applying the formula direct to the examples, when it is too complex to be well expressed in words.

4th. In providing tables, so far as feasible, to meet the requirements of practice.

By means of these tables and the simple rules given therewith, most of the problems likely to occur with respect to the measurement of water in motion, as through vertical openings, over weirs, in pipes, in open streams and through nozzles; with respect to the quantity of water required for various mining purposes, and for the purposes of irrigation; and with respect to the power of water as a motor, are answered direct, or readily solved by anyone familiar with common arithmetic only, as well as by the skilled engineer.

San Francisco, March 17th, 1886.

P. M. RANDALL.

*This series of articles will shortly be published in book form by Dewey & Co., Publishers of the MINING AND SCIENTIFIC PRESS, 252 Market St., S. F. Subscriptions for the book will be filled in the order in which they are received.

Plantations for Growing Railroad Ties.

Hon. R. W. Phipps, Forestry Commissioner of Ontario, in a letter from Southern Kansas to the *Toronto Globe*, says: "One railroad board here, knowing that the growing of wood, when set about in earnest, is neither a slow nor difficult task, has established in Kansas the largest artificial plantation of forest trees in North America. These railway gentlemen themselves gave out the contract for planting over a square mile of land with young saplings of the catalpa and alantus, and their president, observing the success of their experiment, and impressed with its probable excellent financial results, has had planted at his own expense, as a speculation, as much more. Both these plantations are situated near the little town of Farlington, Kan."

These plantations have been planted in sections at different dates—the trees being now respectively two, four and six years of age. At proper intervals carriage drives are left for the convenience of getting out the timber and for inspection. Those first planted are now about 25 feet in height, the last about 12. Some of the taller are 7 inches through the stem. There are in all about 3,000,000 trees in full growing vigor on these plantations. All were planted 4 feet apart each way to shade the ground, but 8 feet is the ultimate intention, which will allow three-fourths of the trees to be cut out, a thing which can well be done when they are fit for fence posts, say 7 to 9 inches through; or, if required, they can stay even longer without in juring the plantation. When rather larger it is expected the trees will give excellent railroad ties, and at their fuller growth of fifteen or twenty years they will supply very valuable timber for cabinet work and house building. Those who have only seen the original forest, with its trees growing at hap hazard here and there, little ones and big, have but a very vague idea of the large amount of wood these closely-planted groves can spare in their process of growth.

Extensive masses of young trees planted in this manner are restricted to but one method of advancement:—the endeavor to throw out masses of leaves to the light and air of the upper surface. The lower branches, hidden in shade, rapidly die and fall to the ground, and the plantation becomes a multitude of long, straight stems, full of life and vigor, but only spreading into branch and foliage at the summit. If a tree in youth he crooked it straightens itself, if thus surrounded, as it advances in height. One acre so growing will give of wood, which is all the better taken, quite a number of cords yearly till all the superfluous trees be gone. Of the 3,000,000 trees originally planted only about one-third will be allowed to come to maturity.

Need of Forest Culture.

Quite too little attention has heretofore been given to forest culture in this country, and as an evidence for prompt and more efficient action in this direction we present the following statistics relative to the timber supply of the United States. The figures are taken from the last report of the American Forestry Congress: The land area of the United States is placed at 1,856,070,400 acres; total forest area, 440,990,000 acres; total farm area, 295,650,000 acres. Of unimproved and waste lands, including "old fields," there are 1,115,430,400 acres. The census reports the consumption of 145,778,137 cords of wood and 74,000,000 bushels of charcoal for fuel in dwellings, stores, factories, steamboats and locomotives. This in a single year would clear the forests from an area of 30,000,000 acres. The census also reports that in 1880 forest fires consumed the trees on 10,274,089 acres, and there is no reason to believe that a less area will be burned over than in 1880. The census gives the amount of lumber cut in 1880 as 18,000,000,000 feet. Last year the cut had increased to 28,000,000,000 feet, which would lay bare an area of 5,600,000 acres. Altogether, it appears that the forests of the country are subject to an annual drain of 50,750,089 acres. Good authorities on the subject say that in this rapid destruction of timber the woods suitable for vehicles are very largely represented.

THE WORLD MUST MOVE.—In 1877, electric lighting by the incandescent system was declared by many to be contrary to the scientific principles. The same was said of the use of iron, and later of steel, in bridge building. The Suez canal was once denounced as a wild and foolish scheme. Less than fifty years ago educated mechanics asserted that steamships could never carry enough coal for a long ocean voyage. Leading ship-builders told us that iron ships could not swim, and when one or two floated it was said that they would not hold together permanently. Rolls for flour making were once hooted and derided. The world will not stand still for anyone.

BIGELOW AND THE PANAMA CANAL.—A recent dispatch from New York says that much curiosity is manifested by downtown financiers as to the tenor of the report to the Chamber of Commerce on the Panama Canal project, which has just been prepared by Hon. John Bigelow, who recently made the trip to the isthmus as the guest of De Lesseps. It is understood the report is an exhaustive one, and though it does not condemn the great enterprise either as an engineering or a financial undertaking, yet as an entirety it is characterized as not of a character to excite in America popular enthusiasm in its behalf.

USEFUL INFORMATION.

Canaries.

Their Value as Pets and How to Teach Them Surprising Tricks.

A pet canary in the house is a sunbeam. Always busy, never having an idle moment, and always doing something new, it enlivens the dull and encourages the slothful to industry. Young girls or wives with a long and lonely afternoon of mending before them can set the cage on the table beside the work-basket, chat to the bird, sing with it and teach it new notes as the needle is plied. Patience and continual instruction only can teach a bird tricks. Because it sometimes gives no outward sign of imitation is not to be accepted as a belief that it is not learning. It is practicing the trick in private, and not until after a perfect rehearsal will it give a public exhibition. To teach a bird to kiss hold him lightly, chatting in soothing tones till he is quiet; then kiss the bill repeatedly, soothing him with gentle talk. Kiss the bill again and again till he ceases to struggle in fear of the salute; then bestow a final one—a kiss of approbation—and release him to partake of his enjoyment. Repeat this the next day—several times a day if you wish to teach him quickly—and he soon resorts to this performance as a method of coaxing, opening and closing his bill between your lips exactly as you have done by him; so nearly as bird imitation is possible. If he picks your lips do not notice it before him. The cage of a nervous bird should never be touched without calling the tenant's attention, because being always engaged in some project, an abrupt action startles him just as it would a human being who is come upon suddenly.

To teach him to sit upon your finger, draw a chair up near the cage, hold a conference with him, and then introducing a finger between the wires near his favorite perch, hold it there, patiently reading your hook or paper meanwhile. The new object showing no disposition to harm him, he goes up cautiously for an examination. Then he picks to ascertain the material—maybe he fights it. This is a good sign. He no longer fears it. Repay him with some choice morsel and cheerful words for his courage. Try him again in the afternoon. He may go further and light on it. Possibly the trick may take several days. Be patient. Once the step is attained, vary the program by introducing the finger in other spots. He will soon light on it at any point or angle. Next try thrusting the fingers under the door. Next times fasten it open, blocking egress with the rest of the hand as one finger extends within. When he perches on it draw him forth a little way. Next tempt him to the perch outside a little, and so on. In a short time you but have to open the cage door, uplift a finger, and he is sure to fly for it, and he may be thus called to any part of the room to rest on the familiar perch.

To eat from the fingers, let him hunger several days for some favorite dainty—say a fig. Show him one; disregard his elation; do not let him have it. Spread a few seeds over the end of your finger, and offer them close by his perch, allowing him plenty of time for speculation. Soon he will snatch off a seed or two. If he utterly refuses, put him sadly away, leaving the fig where he may see it. Next day try again; he'll take one or more. That will do. Do not plague him any longer. Give him a piece of fig in the cage and leave him alone until next day. He may feel independent, being snuffed, and refuse to pick. No matter; put him away without his fig. The next day he is sure to pick all off the fingers. Praise the act and reward him. After that it is plain sailing.—*Cincinnati Enquirer*.

PROTECTION TO IRON.—Experiments made under the direction of the administration of the Dutch State railways with various paints on iron plates are reported to have proved that the red-lead paints resist atmospheric influences much better than those of brown-red and iron oxides. The red-lead paint adhered closer to the metal, and possessed greater elasticity than the others. It was also found that better results were attained if before the paints were applied the plates were pickled, instead of being merely scraped and brushed. The test plates were pickled in muriatic acid, washed with water, thoroughly dried and, while warm, carefully oiled.

Because iron and steel are peculiarly liable to corrosion when in salt water, vessels made of them require special protection. This can be given by covering the metal with some alkaline or basic substance, or the oxides of some metal electro-positive to it. Caustic lime and soda are very efficient for this purpose, and act equally well when made into a paint with oil. But their efficiency is destroyed when they cease to be caustic or when they are saturated with carbonic acid, which they absorb freely from the air. Magnesia is equally efficient, and does not absorb carbonic acid. It therefore makes as good a material for a paint as could be desired, and moreover, forms an excellent basis on which to lay an anti-fouling paint, which it protects from the galvanic action of the iron by isolating it, while it does not affect its anti-fouling qualities.

BASE-BALL MASKS.—In the case of Thayer vs. Spalding, involving the validity of a patent for base-ball masks, Judge Blodgett, of the U. S. Circuit Court, this district, without a change

of countenance, remarked that he was not certain but that any device to protect the life of a base-ball player should be declared void on the ground of public policy. The sally coming so unexpectedly was greeted with a very audible smile. The Judge held the patent valid, and granted a decree against Spalding.

HOW TO "KILL" ENGINES.—In these days of railroad strikes we frequently hear of engines being "killed" to render them useless for service. Of course, the supposition is that the damage is intended to be the slightest that can be done to effect the end in view. The ways in which it is done was recently revealed to a reporter of the *Denver Tribune* substantially as follows: The quickest and surest way is to take the throttle lever away. It is easily carried off under one's coat. It will require two days' work and \$15 in cash to replace it. The steam gauges are sometimes knocked off and the water-glass with its fittings destroyed, when the engine is "no good." Again, the eccentric links may be taken off the valve stems, when the engine is dead. The favorite way, when an engine is on the road, is to put out the fire, open the blow-off cock which you see extending out from the side of the fire box, under the cab, and let out all the water. Then the engine must be hauled to the nearest tank and filled up before she can be again fired up. In killing engines the strikers remove such of the parts as will require the longest time to replace, and very likely at the same time let the water all out of the boilers.

SOLDER FOR GLASS, PORCELAIN AND METALS.

—Glass, porcelain and other metals can be soldered, according to the Pharmaceutical Record by an alloy made as follows: Copper dust obtained by precipitation from a solution of the sulphate by means of zinc is put in a cast iron or porcelain lined mortar and mixed with strong sulphuric acid, specific gravity 1.85. From 20 to 30 or 36 parts of the dust are taken, according to the hardness desired. To the cake formed of acid and copper there is added, under constant stirring, 70 parts of mercury. When well mixed the amalgam is carefully rinsed with warm water to remove all the acid, and then set aside to cool. In 10 or 12 hours it is hard enough to scratch tin. When required for use it is to be heated so hot that when worked over and brayed in a mortar it becomes as soft as wax. In this ductile form it can be spread on any surface to which it adheres with great tenacity when it gets cold and hard. It is intended for this alloy to be used to solder such articles as will not bear a high temperature.

GOOD MEALTH.

Premature Baldness.

O. Lassar has continued his observations on the nature of premature baldness, and has further convinced himself of the communicability of at least the form associated with dandruff. When the hairs which fall off in such cases are collected, rubbed up with vaseline, and the ointment so made is rubbed among the fur of rabbits or white mice, baldness rapidly makes itself visible on the parts so treated. That this is not due to the vaseline was shown by anointing other animals with the vaseline alone, which produced no effect whatever. He considers that the disease is spread by hairdressers, who employ combs and brushes on their customers, one after another, without any regular cleansing of these articles after each time they are used. During frequent visits to the hairdressers, it can scarcely fail that brushes are used which have been shortly before dressing the hair of one affected with so common a complaint as scaly baldness. Females are less often affected with this form of baldness, because the hairdresser more frequently attends to them at their own homes, and there uses their combs and brushes. In order to prevent as far as possible the commencement of premature baldness, the hair should be cut and dressed at home, and with one's own implements, and these thoroughly clean. When it has begun, the following mode of treatment is suggested: The scalp is to be daily well soaped with tar or fluid glycerine potash soap, which is to be rubbed in for 15 minutes firmly. The head is then to be drenched with first warm water, and then gradually colder water. A two per cent corrosive sublimate lotion is next to be pretty freely applied. The head is then to be dried, and the roots of the hair are to have a one per cent solution of naphthol in spirit rubbed into them. Finally, a pomade of one and one-half to two per cent of carbolic or salicylic oil is to be used on the head. This treatment has now in many cases brought the disease not only to a stand, but the hair has been to a considerable extent restored.—*Journal of Health*.

NEED OF REST.—Dr. Holland, than whom there were few more observant and thoughtful men in modern literature, once said: "The great trouble with us is that we do not play enough." This is as true to-day as it was fifteen years ago when he uttered the quoted words. The business man of to-day does not play enough. He runs too much in a groove. He expects too much of himself. The human machine fails to respond some day suddenly,

and a learned opinion is given as to the physical cause of the men's early death. Relaxation is the tonic and lubricant of an active life, and the business men who fail to take it, simply lose time. When a man exclaims: "I can't afford to take the time from business for this or that occasional relaxing of the rigor of daily exertion," we wonder if he ever reflects that sickness and "breaking down" are very likely to take time for him. We heard a business man not long ago advise a younger one to "keep at work; stick to it through all seasons—never miss a stroke or a moment," if he would succeed. But it was bad advice. He "sticks" best to his business who is best able to stand up to its physical demands, and this bodily power is secured only by rest, absolute rest—not mere tired sleep, but the putting off of business with the coat and the taking on of change, that rests with the dressing gown. The man who carries his business to his sitting-room or his bed is simply digging his grave. "There is nothing better established," said a medical man of prominence recently, "than this—that the stirring American business man cuts short his life by fifteen or twenty years." And we have it in the testimony of statisticians, concludes the *Record-Union*, that the vital statistics of the country prove this to be true.

INSOMNIA IN THE AGED AND ITS TREATMENT.

—In opening a discussion on this subject before the late meeting of the Clinical society of New York, Dr. C. L. Dana said that he had found the information contained in the text books upon insomnia in the aged was very slight in amount. Insomnia was not frequent in the aged, but when it was present, it was sometimes very intractable. Pathologists thought it was due to anemia and malnutrition. The thickened arterial walls and the high arterial tension from the contracted kidneys, and similar states, which were found in the aged, would indicate that the blood supply to the brain was deficient. The insomnia produced by anemia was characterized by drowsiness during the daytime, the patient falling into little naps while at night he was unable to obtain any rest. This was true of the young as well as the old. If in any case we found no actual disease, it was customary to try iron and rich diet. In the speaker's experience, however, iron did not relieve the anemia of the aged so as to produce sleep. Alcohol with the food was another remedy, and many recommended hot gruel or hot milk with alcohol before going to bed. While alcohol would relieve some cases, there were others in which the insomnia was increased.

The bromide and chloral when given in enormous doses, often failed to give relief. Opium was another remedy. Dr. H. C. Wood had recommended that we make our aged people opium eaters and alcohol drinkers. The speaker had not found that opium always agreed with the aged, and in his experience, where opium had produced sleep, it was sometimes followed by such physical and mental depression as precluded its further use. He had been disappointed in bromide and chloral and considered the results of opium sometimes disastrous. He recommended good food, warm drinks at night, and small doses of codeia with cannabis indica. Valerian and lavender, hyoscyamine, lupulin sometimes were also useful drugs.

THINGS WORTH KNOWING.—A fever patient is cooled off and made more comfortable by frequent sponging with warm soda water.

A half teaspoonful of soda in half a cup of water will relieve sick headache that is caused by indigestion.

Warm mustard water should be given to one who has accidentally swallowed poison; this will cause vomiting; after that give a cup of strong coffee. That will counteract the remaining effects.

When going from a warm room out into the cold air close your mouth and breathe through your nose to prevent taking cold.

A hard cold is oftentimes cured by a cup of hot lemonade taken at bedtime, as it will produce perspiration.

Consumptive night sweats may be arrested by sponging the patient's body at night with salt and water.

Teething children may be relieved of convulsions by being immersed in a warm bath, and cold water applied to the head.

For croup or pneumonia bruise raw onions, lay on a cloth with powdered gum camphor sprinkled over it and apply to chest and lungs, and cover with hot flannel. This is a sure cure when taken in time.

RIVERS A SOURCE OF THE SPREAD OF CHOLERA.

—The *Lancet* has made up its mind that rivers have much to do with the spread of cholera. Paper-makers will be interested to know that the severity of the last cholera epidemic at Grenada has been traced to water contamination, due to a paper-mill. The rags used at this mill were washed in the stream from which Grenada City draws its water supply. The rags thus washed came from Valencia and other cholera centers. No cholera cases had occurred in Grenada up to the time when these rags were imported. Afterward the cholera spread over the province, following in every case the course of the infected stream. Only one town thus situated escaped infection, and this because its 12,000 people drank no river water.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

CHROME.—Livermore *Herald*, April 24: The Wm. M. Mendenhall and Douglas Mendenhall chrome mine is now nearly ready for business. The new road will be finished by Saturday night, and the workmen have begun taking out ore. They have a five-foot ledge of good chrome, and if the weather permits, will begin hauling on Monday. Six men are at work at the mine and on the road. Chrome hauling was resumed, on Monday, and will be continued this week, at least, if the weather permits. Messrs. Pitcher and Knight have contracted to ship 100 tons by steamer, and are now working to fill the order.

Amador.

IMPORTANT STRIKE IN THE BIG TUNNEL.—Amador *Ledger*, April 24: It is gratifying to be able to report a notable event in connection with the tunnel operations at Middle Bar. This enterprise has been run over 3300 feet, without meeting with any ore worth speaking of. Small seams have been cut, but neither rich nor extensive enough to justify any hopes of re-imburasing the owners for the vast sums spent in making this hole in the ground. Lately the header has been in near proximity to the point immediately underneath the works of the Mammoth mine where the rich strike was made some two years ago. A noticeable change was observed in the nature of the formation passed through. The hard granite gave place to soft material mixed with slate and quartz, which encouraged the belief that a rich strike might be made at any time. Early this week almost the entire face of the tunnel entered quartz, and this quartz body contained a seam of that rich, black gold-bearing metal identical in character with that met with above. This seam is said to be two feet wide in the floor of the tunnel, and extends above and below the tunnel level. Over a ton of this metal has been taken out up to Wednesday, and the whole of it placed in sacks. It shows plentifully of free gold, and while the whole of it is unquestionably rich, we cannot venture any opinion as to the value of the ore already extracted. This black metal is very deceptive in its surrender of precious metal. Some of it may be one-fourth gold, and again some similar in appearance may yield comparatively little gold. It is unquestionably true, however, that many thousands of dollars have been already taken out. The important truth demonstrated by this development is that the rich ore seams of this district run deep. Where the strike has been made is 600 feet from the surface, and over 400 from the upper tunnel level. There is no room for doubt that it is the same ore deposit which has been worked above; and the conclusion is irresistible that the vein runs the entire distance between the two tunnels, and also to unknown depths below the big tunnel. With this fact conclusively proven, Middle Bar mining district must rise in newness of life. The development of other promising claims will be pushed with renewed vigor. It is by far the most important discovery that has been made in quartz mining between Jackson and the Mokelumne river.

SOUTH SPRING HILL.—The last clean-up of this mill, made the first of the month, yielded over \$20,000, in free gold, without sulphurets. This is an average of over \$1000 per stamp; and reckoning one ton of ore crushed per stamp each day, makes an average of over \$16 per ton, exclusive of sulphurets. There is no other mine in the county, the Pacific alone excepted, that makes as flattering a showing. It is moreover, a comparatively virgin mine, just entering upon its career of gold production. Such is the estimate placed upon this splendid property by those who are in the best position to judge of its merits, that within the past two weeks the sum of one million dollars was offered for it, and refused by the owners. Negotiations are still in progress, with the probability that even this vast offer will be increased. At the mine a tunnel has been run from the side hill fronting the road, to tap the shaft at a depth of less than 100 feet from the surface. This is mainly intended as a precautionary measure, to provide an outlet from the shaft in case of accident to the works above. A new reel is being made at one of the foundries in Sutter Creek, for the new round wire cable, which is to replace the present flat wire rope. The mine and mill furnish employment to nearly 50 men.

MISCELLANEOUS.—At the Kennedy they are still making preparations to commence sinking. The shaft is being repaired where necessary. They are also changing one of the water buckets for a skip for hoisting rock. It is expected that in a few days more everything will be in readiness for sinking. The last dividend of the Plymouth Consolidated Mining Company was 75 cents per share. More men are being put to work at the Zeile. The force of miners is fast approaching to the number before the cave, and we hope shortly to report a full force at the mill also, with all the stamps in motion once more.

El Dorado.

A BUNCH OF COAL.—El Dorado *Republican*, April 26: About a year ago Hale & Baughman uncovered a bunch of coal in their hydraulic claim near Indian Diggings, which proved to be of considerable dimensions, though not sufficiently extensive to be called a bed. They have not yet reached the end of the bunch, though it is supposed that it is not much farther in the bank. The coal lies at a depth of 20 feet below the surface surrounded by gravel. The body is about 15 feet in height, 25 in width and is exposed for a length of 300 feet. In quality it resembles that found near Lone, being of a soft, loose texture, a brownish color, and burning with considerable smoke and flame. Last fall the deposit was set on fire and has been burning all winter.

NASHVILLE.—Nashville is virtually dead for the present. There are undoubtedly some good mines here and they will be worked at some time. All it needs is a little capital to start with. All the mining ground near this place is located and nearly all by parties who are too poor to do anything with it themselves. I am satisfied that if the Nashville mine were to fall into the hands of a mining man it could be made a paying property as soon as the water

could be taken out. There is some talk of the Central mine starting, but it is feared the report will amount to nothing. Dr. Smith, of Plymouth, says he is going to resume work on the old Sugar Loaf mine as soon as the weather permits. This mine used to employ quite a number of men, although it has not been worked for a good many years. It is situated about two and a half miles nearly west from here.

YIELDING WELL.—Placer *Observer*, April 24: Reports from the Slate Mountain mine are to the effect that the mine is yielding fabulous returns, and is by far the richest in the county. The Gopher-Boulder mine, near Kelsey, is being run at a 240 gait, and on ore, too, that promises well for the future of the mine. The El Dorado Water and Deep Gravel Mining Company are about to let a contract for running a prospecting tunnel into Texas Hill, a distance of 1,000 feet, at a point just below the old shaft.

Inyo.

WHITE HILL.—Inyo *Independent*, April 24: Two carloads of ore from the White Hill mine are ready for shipment. The mine is looking about as well as usual. Dan Hock is at work on his mine adjoining the White Hill; he is doing some dead work at present but will begin getting out ore in a few days.

Mariposa.

THE NORTH SIDE.—Coulterville *Cor. Mariposa Herald*, April 23: The whole country abounds in rich mineral veins of quartz, iron, cinnabar, copper and lead. We have good roads through all parts of the country. The present outlook for our mines is truly encouraging. The Red Cloud is showing up splendidly, producing some immensely rich ore. The vein is growing larger as they go down, and as it grows larger it grows richer. The company are putting in a new boiler preparatory to adding eleven more stamps to their mill or crushing capacity. Quartz Johnson has been here for several days with two English gentlemen making an examination of the Cook property. They left highly pleased with the prospect, and intimated that they would urge their company to purchase. If such should be the case, Coulterville will be all right again. Those mines, in the hands of a strong English company, would be worked for all time to come at a good profit to the owners. We are all hoping the sale will be made and the mines started up.

Mono.

BENTON.—Cor. Inyo *Register*, April 22: The concentration of low grade ores gains ground, and from what I can learn, with late improvements, the machines are proving a decided success. In thinking over the matter, I believe if a good concentrating works were established out in Indian or Clover districts, say at the old Banner mill, or better still, at Mrs. Morris' springs, it would be a paying proposition for a good company with capital enough to put up a good plant and pay their way. The mineral belt is very extensive and has never been thoroughly prospected, as the ores that were found were not of high enough grade to pay the excessive cost of transportation, though they cannot be said to be of very low grade. The few men who have devoted their time and means to the development of some of the ledges find themselves at the end of their tether and unable to do more; but enough has been done to claim the attention of milling companies and induce them to try their hand. A number of claims could be got hold of that carry not only low grade, but also high grade ores that cannot be profitably utilized under the present processes. Here are first the two claims of John King's and extensions that show every indication of being continuous and permanent ledges, giving assays from \$12 (the poorest looking rock) up to \$60, \$100 and \$200 per ton, principally gold, but with a percentage of silver. A test lot of 30 tons worked at the Montgomery mill, about a year ago, yielded enough free gold to show that it would pay, outside the cost of hauling; but in the tailings sluices there was found a grayish deposit that had to be shoveled out from time to time. Samples of this were tested by Dr. Griswold, and found to be a base of lead, with other metals, and gave assays of over \$200 in gold.

Nevada.

ON THE RIDGE.—Grass Valley *Union*, April 26: In the country below San Juan much interest is now manifested in quartz prospecting, owing to some recent discoveries, and one lead has been traced entirely across the country from the Middle to the South Yuba, passing a short distance below Sweetland, which is as much as 40 feet in width in places. It has prospected well in free gold at different points, and locations have been made over a long distance of country. If the good prospects continue, with the aid of water power, which can be made available, quartz mining may obtain a foothold in that section, where but slight attention has ever been paid to the business before. In the vicinity of French Corral a claim known as the "Slide" also shows quartz carrying free gold, that offers good encouragement for working. The prospects in quartz are sufficient to justify considerable exploration, and it is not improbable that good mines will be opened there.

LOCATED.—North San Juan *Times*, April 24: The quartz ledge recently discovered in the neighborhood of Buckeye Hill has been located for a distance exceeding 8000 feet by men residing at this place. It has been prospected the entire length, and gold in considerable quantities has been found all along the lode. Several old tunnels originally run by hydraulic mines strike the ledge at different places two and three hundred feet below the surface, and at each of these points free gold is found in the rock. At many places the owners are sinking on the ledge with a view of making a thorough prospect, and at 10 and 20 feet below the surface rich rock is found. One of the parties who is deeply interested in the ledge says it is the richest ever found in California.

DRIFTING.—Thomas Reese and Mr. Cunard have leased the Grizzly Ridge mine, near Columbia Hill, with the intention of working it by the drifting process. They commenced work on the mine last Monday. It is to be hoped they will meet with success.

PHOENIX.—Foothill *Tidings*, April 26: A clean-up from the Phoenix mine, 34 loads (nearly two tons a load), was milled, and yielded \$2,000, or \$58.82 to the load. The mine is looking well, but the water has been a great bother the past month or two. That will be remedied as the ground dries.

BANNER MOUNTAIN.—Grass Valley *Union*, Apr. 25: Considerable quartz mining prospecting is being

done in the immediate vicinity of Banner. There are a number of ledges thereabout. The North Banner Tunnel company has done much work out there in the way of mining development, and the property is held as valuable. The ledge in the main tunnel is showing strong and of excellent quality.

EMPIRE.—The twenty stamps of the Empire mill are kept running seven days of the week, and there are now 300 tons of ore on the mill dump, which shows that the underground work is pushed energetically. The North Star is also turning out a large amount of ore, supplying both the Larimer and Omaba mills of ten stamps each. There are 135 men at work in the North Star, including tributaries and those on regular pay. The ore is being taken out from seven levels from No. 4 to No. 13, the latter being the lower level.

Placer.

DUNCAN HILL.—Placer *Herald*, April 24: Mr. Geo. P. Johnson, joint owner with Mr. Goly in the Christmas-Gift quartz mine, located near Auburn, on Duncan Hill, showed us a specimen while in town last Saturday that he had recently taken out which weighed 10½ ounces, and which was nearly all gold. It was estimated to be worth in the neighborhood of \$150. He informed us also that the Oliver mine, on the same hill, known as the Southern Cross, is looking very well and turning out some first rate milling ore. Duncan Hill has been the scene of some rich finds, and yet, comparatively speaking, its surface has hardly yet been touched.

NEW MILL.—Placer Co., *Republican*, April 24: It is expected that the new stamp mill at the Lee mine will be ready for crushing next week. The owners have spent considerable money on the property and all their machinery, the engine, and track are of the best. They have made over 400 feet in the cross drift and have not reached across the channel yet. The Hoady mine adjoining is paying very well with only an arasta. The clean-up on the 5th inst., amounted to \$607, and on the 12th to \$460.

MORNING STAR.—Grass Valley *Union*, April 23: A test has been made of the rich gravel recently struck in the Morning Star drift mine, near Iowa Hill, and from a number of car-loads washed the yield was \$11.50 to each car. That beats the celebrated Bald Mountain claim at Forest City. The interests in the Morning Star are principally owned by the Messrs. Coleman, of Grass Valley.

FOREST HILL.—Cor. Placer *Herald*: Our town is prospering. Mining interests are in a thriving condition, with a certainty of an increased output from our bonanzas, when the "Excelsior," "Baker Divide," and other mines in this vicinity shall become fully developed.

STRIKE.—Placer *Argus*, April 22: A rich strike was made last week in a mine owned by Hamlin Bryan, Jose Romualdo and others, on Pine Flat Point, between Forest Hill and Bath in the Volcano Bar trail. The rock is said to be very rich, going as high as \$1000 to the ton.

San Bernardino.

CALICO DISTRICT.—Print, April 25: There is one branch of business in this district which indicates, in proportion to its extent, the amount of ore taken from the mines, and that is teaming. We were informed by Mr. McDuffee, of the Calico Freight Co., of Daggett, that they were hauling more ore now than at any time during the past. They have ten large teams constantly engaged hauling ore and borax and are two weeks behind in hauling owing to the unusual amount of ore on the various dumps of their customers. The large teams of Drew & Ball and Robt. McCue are also busily engaged hauling ore to the mills. There is more chloriding going on now than ever before, and the amount of ore taken out by chloriders is on the increase. The success of so many in this character of mining is an incentive to others to try their "luck," and where operations are carried on by miners who have had experience in handling the various kinds of ores in this district, their efforts rarely meet with failure. There are a number of undeveloped mines in the district, which, when thoroughly prospected, may prove profitable chloriding propositions, and eventually develop into good paying mines, as others have. Wm. S. Cranz has started leaching works for the reduction of ores near the foot of Main street. He has a tank that will contain 2½ tons. It is his intention before long to put in more tanks and operate on a larger scale. The leaching works of W. A. Sharp & Co., near the foot of Main street, are run to their fullest capacity, consisting of tanks that will hold thirteen tons.

RICH RETURNS.—The other day H. B. Stevens received the returns from a car-load of ore shipped to the reduction works at Kingman, Arizona, from his mine in Mineral Lake district, near Bagdad railroad station. Upon request he showed us the statements from the mill, which are as follows: Lot No. 1, consisted of 6894 pounds of ore, which gave \$1383.55 in silver, and 20 per cent copper. Lot No. 2, 9408 pounds gave \$711.52 in silver. Lot No. 3, 5195 pounds, 31 ounces in silver, 60 per cent lead, 45 per cent for each unit, total \$86.16. These returns speak for themselves, showing that the mine has substantial evidence of wealth beneath its surface. Such a high per cent of lead makes it a valuable mine for smelting. The above ore was taken out in 30 days by three men, amounting to about \$2200, realizing a handsome profit to Mr. Stevens. The 10-stamp quartz mill 30 miles south of Cadiz railroad station is now completed and will soon be in operation. The prospects of a thriving camp being established there are bright, and its output of bullion will no doubt greatly add to the annual output of San Bernardino county.

Shasta.

CHLORINATION.—Shasta Co., *Democrat*, April 22: De Forest, the assayer, is talking of putting up small chlorination works in connection with his assaying business. E. L. Reese is opening his mine near the county hospital with day and night shifts and having the ore crushed at Andy Fife's mill on Spring creek, with fair results. Our placer miners cannot complain this season of the lack of water. They probably never had a more propitious season for placer mining, as the rainy weather has extended almost into the lap of summer. The Blakemore Brothers of Deadwood made a handsome clean-up last week. They had been running two arastras, one fifteen days and the other a month, and realized from this run \$4500. Estimating that each arastra

crushed one ton each every twenty-four hours, the usual capacity, the ore crushed averaged about \$100 per ton. De Forest last week made a milling test of eight pounds of rock from the Carson & Snyder mine on Squaw creek. The sample was taken from the end of the lower tunnel, at a depth of 150 feet. The yield was at the rate of \$2080.75 a ton in gold. Another sample of five ounces, milling test, yielded at the rate of \$17,875 per ton. The above is a milling test for free gold. The sulphurets from the ore averaged 20 per cent and assays \$2085.60 in gold and \$35.70 in silver. There is a clay seam in the vein at this depth, about four inches in width, which samples from \$30,000 to \$50,000 a ton in free gold. How extensive this rich body of ore is the boys have not yet determined, but suffice it to say they see enough in sight to yield a handsome sum. The rest of the ore in sight, exposed by a 150-foot tunnel, samples by a fire assay \$33.77 a ton, and it is safe to say will mill with very little sorting \$25 a ton.

Sierra.

ALASKA.—North San Juan *Times*, April 24: We received a letter from Col. Bates, Superintendent of the Alaska mine, in which he says it is very annoying to him to have false rumors published of affairs at that mine. He says the mine is perfectly safe to the 400-foot level and work has been carried on almost uninterruptedly. The mill is running full time and as soon as the roads will permit a sinking pump, ordered hauled from the railroad to the mine, will be put in place, and we will quickly regain the 500-foot level. There is no stopping the progress of the Alaska mine. No extraordinary obstacles to be encountered can do it, and it is too well equipped to be endangered. All this is joyful news to us. What we said about the mine, to which the worthy superintendent objects, is that the mine had been flooded but was now worked on the 400-foot level.

ALASKA.—Mountain *Messenger*, April 24: The Alaska mine, at Pike City, has again got control of the flow of water in the mine and started the mill. The company will add 20 more stamps this spring, making 60 in all. The rock gets richer as they sink on the ledge. A piece about the size of a brick recently taken out contained \$1,000. The Pilgrim quartz mill, at American Hill, started crushing on Thursday last. The company has plenty of ore in sight, which prospects well, but how well it will mill cannot be told until a run is made. Work will soon be commenced to prospect for gravel in the old North Fork mine. It is reported that a new mill will be put up this summer on a quartz ledge at American Hill. The tunnel now being run for the extension of the Good Hope ledge is now in 200 feet, one-quarter the distance to which it is expected good paying quartz will be struck. Joe Parrena and Henry Limperich are running the tunnel.

THE COLOMBO MINE.—Sierra *Tribune*, April 24: The ledge in the Colombo mine is six feet wide, and two feet is very rich. The dump contains about 40 tons of ore. The principal work being done now is in a raise for air.

A GOOD CLAIM.—Saundershaus, Casserly, Bessler & Co. are obtaining some very flattering prospects in their quartz ledge, near Butcher ranch. A box of the ore was shipped the other day to Saundershaus, who is at present making his headquarters in San Francisco. The boys are exceedingly well pleased with the appearance of things at this stage of development, and are working with a will in order to get the mine in good shape this summer.

A PROMISING MINE.—At the Mercer claim, which is located 1500 feet east of the Florence mine, and is owned by the same parties, viz., Messrs. Mooney, Stephenson, Freeman and Hutchinson, the tunnel is now in 263 feet. The vein, which was cut through last week, is four and one-half feet in width and shows a very fine character of ore. At present an air shaft is being put through from the face of the tunnel to the surface, a distance of about 90 feet. When the shaft is completed the work of pushing ahead the tunnel on the vein will again be resumed, and operations in that quarter pushed ahead with all possible speed. From reliable information we have gained concerning this property it is quite certain to prove a paying institution to its owners, and one of the "solid" mines of Sierra City district. Twenty-seven ounces of ore taken from the Mercer ledge was assayed by A. Maltman after the foregoing was set up, and the result was a yield in gold of \$173.09 to the ton, and of silver, \$13.57 per ton. In the quartz assayed there was not any gold visible to the naked eye. This is a pretty favorable showing.

Trinity.

NEW RIVER.—Trinity *Journal*, April 24: There are from 80 to 100 men at the New River mines, and the quartz prospects of that district are very encouraging. It will be lively again this summer, and prove a permanent camp.

PAYING WELL.—We learn that a recent clean-up in the Enterprise mine at East Fork was very satisfactory to the new owners, McDonald Bros. and Levi Day. There were 26 tons of quartz crushed in the arastra and the yield was \$2,000. Some prospecting has been done and enough paying ore is said to be in sight to insure the early return of the purchase money. Mr. Barney McDonald is in charge of the Enterprise.

Tuolumne.

GROVELAND.—Cor. Tuolumne *Independent*, Apr. 24: The James Bros. are still running their arastra with splendid results. The mine continues to show rich ore and lots of it. Rumor says the ore pays from \$35 to \$40 per ton. Big Oak Flat is possessed of a five-stamp steam mill. The machinery is all on the ground, and we hope in a few weeks to hear the steam whistle. This mill is being built by Gosling & Co. to work the ore of the Mississippi mine, which they have bought. Mr. George Shirra is still running the arastra on the old dump of the Garner mine, and is very hopeful of the future of the property, and it is amongst the possibilities that there will be a mill there this summer. Reports from the Red Cloud mine are very encouraging. A rich strike is reported on the 350-foot level. The Kanaka mine has been doing well this season. The mill is shut down for a few days for repairs, but will soon start up and run as there is water in Indian creek.

GOOD OUTLOOK.—Union *Democrat*, April 24: While the past year has been one of depression, with dull business and necessarily great stringency in money matters, there is no reason for desponding.

This county is dependent more upon its mining resources than upon any other industry. The same rule applies to this as does to all other mining counties. They are subject to more vicissitudes than those sections that depend upon agricultural and manufacturing industries. Yet where there are good mines, the general average, for a series of years never fails in the end to make good returns, equal to the communities that depend upon the farmer or the manufacturer. For two years past mining has not had a fair show for want of sufficient water and unpropitious seasons. This year the heavy snows in the Sierra is a certain guarantee of a sufficiency, for extended operations late in the season. The breaking up of the storms are earlier and will give a longer season than for some years past. There is more than usual activity at this early date in mining operations that promises well for a good mining year. Already there are several mines where the developments are exceedingly satisfactory, and before the season closes are looked upon as certain to add to the wealth of the owners. Numbers of mining men are looking for properties to develop. There was never a brighter prospect for mining than is now presented.

NEVADA.

Washoe District.

HAILE AND NORCROSS.—*Enterprise*, April 24: The fine ore vein development above the 3100 level simply shows better and more extensive as further explored. It is over 20 feet or four sets of timbers in width, and of unknown length. Very little can be done to advantage just at present, however, in the way of wholesale ore extraction, owing to the lack of ample hoisting facilities, or until the Potosi drift is completed. On the 2900 level the main north lateral drift toward Savage is making good steady progress, and has passed to the northward of crosscut No. 4, with its face in low grade ore, with bunches of high grade. The connection being fully completed between this level and the 3000 by means of the upraise, a good air circulation is secured, giving excellent facilities for the extraction of ore from that point when required.

POTOSI.—The main south or northeast drift from the Chollar on the 3100 level was advanced 65 feet, making a total length of 420 feet from the Chollar line, or 540 feet from the switch in the west drift from the Combination shaft in Chollar ground. This Potosi drift has about 300 feet further to go in order to reach the south line and the Bullion ground. As it is being advanced at the rate of about 10 feet per day, it will probably take about six weeks longer. The ground through which the drift is passing is along the west side of the ledge, therefore nothing very interesting is expected until cross-cutting eastward into the vein shall be done. More or less quartz is met with, however, and being all virgin ground, 200 feet below all previous explorations, there is plenty of room for a first-class bonanza to be run into.

CON. CALIFORNIA AND VIRGINIA.—Daily yield about 400 tons, which is reduced at the Morgan and Eureka mills, giving assays from battery samples of about \$14 per ton. The drift being run to the southwest on the 1400 level for exploration purposes is in 685 feet. On the 1650 level the north-west drift has entered the old bonanza stopes, for which it was being run, in order to get at some good ore left at that point.

CHOLLAR.—Nothing doing in this mine at present beyond being an outlet for the waste run out through it to the Combination shaft on the 3100 level from the lateral drift south being run through the Potosi ground. No crosscutting or preparation to sink the Combination shaft deeper at present.

BEST AND BELCHER.—The water in the Osibiston shaft continues to be steadily reduced, and less than 100 feet has to be pumped out in order to reach the bottom of the shaft. Progress is necessarily slow by reason of the great extent of ground to be drained. The pumps are working excellently.

OTHIR.—Exploration work goes steadily ahead on the 300 and 400 levels at the north end of the mine, with no new features to relate beyond the starting up of a new crosscut west on the 400, which is in about 70 feet, showing merely vein porphyry and a little quartz.

MEXICAN.—On the 700 level the joint Mexican and Union lateral drift is now in 710 feet. Material in face, quartz, vein porphyry and clay, the formation being of a more favorable and encouraging character than heretofore.

ALTA.—The main north lateral drift on the 700 level is about 150 feet into the Benton ground, and has 100 feet further to go in order to connect with the old workings of the Lady Washington mine, toward which it is heading.

YELLOW JACKET.—The daily yield has been increased to 140 tons, the capacity of the Brunswick mill having been increased by additional concentration facilities. The old ore stopes above the 1300 level hold out and yield finely.

CROWN POINT AND BELCHER.—Daily output about 320 tons. The breasts and stopes of the 1500, 1600 and 1700 levels are said to be looking especially fine, and more ore comes from that point than heretofore.

GOULD AND CURRY.—The crosscut west on the 600 level continues in vein porphyry, with more quartz coming in. The southeast drift is advancing in quartz, porphyry and clay.

UNION CON.—The crosscut east from the lateral north drift on the 500 level is in 192 feet. Material, vein porphyry, with a little quartz and clay.

SIERRA NEVADA.—The west crosscut on the 500 level continues in an unfavorable formation of hard quartzite and dry vein porphyry.

KENTUCK.—Daily yield increased to 60 tons from the old upper workings above the 1300 level.

Belmont District.

NEW DISCOVERIES.—Belmont *Courier*, April 20: The Chicago Mining and Reduction Company's mine, under the able superintendence of D. H. Jackson, is fast developing into one of the largest and most valuable mines in the State. New discoveries of ore are constantly being made, and as this ore is of a high grade and a fine milling quality, increased bullion shipments are certain. The pump is working, and as soon as the incline shaft is drained, sinking will be resumed. When work was suspended in the incline a ledge was coming in that

carries ore of a good grade. Burleigh drills are on the way from San Francisco, and on their arrival will be used in the mine to expedite work. The mill is running steadily and giving satisfactory results.

EL DORADO NORTH.—County auditor and recorder W. F. Leon and John Griffin will work their mine—the old El Dorado North—this summer. In the early days of Belmont this was one of the most productive mines in the district, and why work was suspended and the mine abandoned has always been a puzzle to those acquainted with its history. Its present owners are well satisfied that they have a valuable mine that only requires the outlay of capital and the application of muscle, powder and steel to place it on a productive and paying basis. The resumption of work in the Belmont mines would gladden the hearts of the people of Nye's metropolis, but we suppose that resumption will be largely governed by the fate of silver.

Eureka District.

ORE SHIPMENTS.—Eureka *Sentinel*, April 24: Ore shipments from the mines in Eureka district to the two reduction works in town have been unusually numerous the past week. Ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Eureka Con. works—Silver West mine, 1½ tons; Grant, 4; Silver Lick, 21; Phenix, 18; Alexandria, 2; Macon City, 4½; Seventy-six, 100; Dunderberg, 50; Morey, 1½; Iron Clad, 5. To the Richmond works—California mine, 95 tons; Eureka Star, 2; Iron Clad, 4; Tybo, 1½; Oriental, and Belmont, 6; Bullwhacker, 5; Rosalind, 4; Grant, 1; Adelphi, 6; Paul Wry, 2; Continental, 6½; Hamburg, 83.

TOO SOON.—The Richmond-Albion compromise is bringing back to Eureka a number of the former employees of the first named company, believing the settlement will enhance their chances for employment here. So far as known, the Richmond company do not contemplate any extensive operations in the near future—certainly not before July, if then.

Garfield District.

STRIKE.—Inyo *Independent*, April 20: There is report of a rich strike in Garfield district, near the Farrington Brothers' mine. Ore from the new find is said to go as high as \$1500 a ton. The claim belongs to parties in Dayton.

Hawthorne District.

THE NORTH STAR.—Walker *Lake Bulletin*, April 21: The appearance of the North Star is making the stockholders wear broad faces. Everybody will be glad to learn that the ledge on which they are now working, is twelve feet wide and gives fair assays clear across.

THE DICTATOR.—No doubt about the future of the Dictator, can now be entertained, as each day exhibits an increase in the size of the ledge.

Reveille District.

ORE.—Belmont *Courier*, April 20: The cholorides of Reveille are still taking out fine ore.

San Antonio District.

CHLORIDING.—Belmont *Courier*, April 20: It is expected that some chloriding will be done in the mines of San Antonio district as soon as the weather will permit.

Sprucemont District.

ORES.—Cor. *Elko Independent*, April 24: A company from Salt Lake City, in which Walker Bros. are interested, have made a contract with mine owners in Sprucemont for 100 tons of ore, to be shipped to that city. They have also contracted for transportation of the ores to Wells. The mines of Sprucemont are awakening up capital in the Utah country. They are found to be very remunerative, both to the miners and the mills.

Tuscarora District.

BELLE ISLE.—*Times-Review*, April 24: North drift from East crosscut, No. 1, 450-foot level, has been extended 19 feet. Belle Isle and Navajo joint crosscut, 150-foot level, has been extended 5 feet.

NAVAJO.—Crosscut No. 5, 350-foot level, has been extended 15 feet. South drift, east vein, 250-foot level, has been extended 13 feet. South drift, from Johnston crosscut has been extended 21 feet. East crosscut from west drift, same level has been extended six feet.

GRAND PRIZE.—North drift on the 200-foot level, extended 27 feet during the week. Stopes producing but little ore at present.

Tybo District.

LOOKING FOR A REVIVAL.—Belmont *Courier*, April 20: Tyboites are anxiously watching and waiting for a revival of mining in that once lively camp. Their faith is undiminished in the permanency of the mines, and they sigh and long for the day when capitalists will take hold of them and prove to the doubters and croakers that Tybo's mines are a permanent and profitable investment. Millions of dollars worth of bullion have been taken out of them and there is still a great quantity more waiting to be extracted.

ARIZONA.

THE LONGFELLOW.—Clifton *Clarion*, April 21: Is moving along as usual and extracting the regular quantity of ore. Development work is being pushed ahead, and occasionally large pockets of ore are encountered. Quite an amount of dead work has been done since the beginning of the year, and some considerable is yet in progress. The old standby continues to produce large quantities of excellent ore, and the mine is not nearly developed to the satisfaction of the management. No very deep workings have yet been reached, and judging from the mine's past record as an ore producer, millions of tons of high grade copper ore remains to be brought to the surface.

THE JOY MINE.—Is employing but six men at present, all that can be worked to advantage. The shaft is now 80 feet deep, and is being thoroughly overhauled, new ladder ways put in, etc., preparatory to extensive development. The prospect for a large body of ore is encouraging, as large quantities of black manganese ore are frequently encountered. The Yavapai and Modoc are being worked for all they are worth, and considerable bodies of good ore are being encountered. These claims though not quite so promising as many older claims, contribute their shares toward swelling the bullion output at the smelters. The Detroit as usual is turning out in quantity the rich ore for which it is famous. The usual number of hands are employed,

and no dead work is being done. The mine is in first-class shape, and the prospect for a bountiful output of copper ore for the second quarter of the year is encouraging. At Morenci the Detroit smelter is running smoothly, and turning out the usual quantity of bullion. The concentrators are housed, and are rapidly approaching completion. When finished, they will add materially to the product.

STATE OF MAINE.—Work still progressing on three lower levels, and usual amount of ore being taken out for shipment.

IDAHO.

PLACERS.—Idaho *World*, April 20: Heretofore placer miners on the other side of the basin have not been so soon in their mining movements as those on this side, but this season they were first to turn the water on. Claims around Placerville have been the scenes of operations for about three weeks.

HARDIN GULCH DIGGINGS.—Idaho *Messenger*, April 23: Johnny Rohrer gave us a few items of the placer ground discovered last fall by Rankin & Tibbits in Hardin Gulch. This gulch is situated on the west bank of the Yankee Fork—about three miles below Bonanza City in Custer County. The ground is, on an average, ten feet deep to bed rock. Mr. Rohrer says he was at the diggings a few days since and prospected the grounds—taking out as high as 50 cents on a shovel point. The gold is worth \$18 per ounce. He thinks Messrs. Rankin & Tibbits will be able to clean up 12 or 15 thousand dollars this year without much difficulty. We rely greatly on Mr. Rohrer's opinion as he is well experienced in placers, and a man of undoubtedly good judgment. Placers are too much neglected of late years. A little more placer and a little less quartz were better, gentlemen. Gulch mining costs but little, comparatively, and is an excellent forerunner to aid the development of our immense quartz interests. Let more men search for the God-milled gold.

MONTANA.

WICKES.—Cor. *Helena Independent*, April 22: The Helena Mining and Reduction company is Wickes, and Wickes is the Helena Mining and Reduction company. Without it there would be no camp and the grass would soon grow in the streets. The company employ about 375 men all told, including the miners at the Alta and the Comet, their monthly pay roll running from \$25,000 to \$30,000. In addition to this a large amount is paid out to woodhaulers in the vicinity. The Alta mine is distant from Wickes about two miles across the trail. The Alta mine has an almost inexhaustible fund of ore in sight, which is hauled over a good road two miles to Corbin, where the company's concentrator is situated. From Corbin to Wickes is but a short distance—possibly two miles. The Comet mine is about five miles from Wickes, on the other side of the gulch. A unique feature in this mine is the manner in which the ore is transported from the mine down the hill, a distance of over two miles, to the dump on the wagon road. A wire cable running over sheaves placed on poles about 100 feet apart, supports ore buckets clamped to, and suspended from the cable. The poles have arms similar to a telegraph pole, on the ends of which the sheaves are attached, so that the buckets swing clear of the poles. A small five-horse power engine is the motive power, and the smooth manner in which the tramway moves down the hill across a depression, up again, and over to the dumps, is a matter of surprise even to old engineers. The company have unlimited ore in sight at these two mines, and their bullion output is immense, working two shifts, night and day, including Sunday. While the ore is not particularly rich, carrying a heavy percent of lead with a trace of gold, it is very easily worked at a good profit.

BUTTE.—*Miner*, April 21: The week just closed has been one of steady and honest development work. Everywhere the report is the same—"the outlook never was better." No one is satisfied with the present, however, and everybody is sinking, drifting and exploiting. The output is constantly increasing, though not in an alarming manner, or in a way to indicate a boom. The increase is just what would be looked for in the natural order of events. Properties that were last year scarcely heard of, or appeared only as prospects, have taken their places alongside the producers, and their number is hopefully large and constantly increasing. Others are coming to that point and the number of producing mines will be largely swelled before the end of this year. The mills, concentrators and smelters are kept in operation to their fullest capacity. In all these institutions the order is improvement. The best methods applicable to our ores are employed. The experience of the best practice the world over contributes to the success of our mills and smelters. It is this vast output and the processes through which the output must pass previous to shipment to which we owe the fumes which occasionally settle down over the town, and which somewhat annoy strangers. The thicker the fumes the greater our financial vitality, and Butteites feel best when the fumes are thickest.

OREGON.

QUARTZ AND PLACER.—Jacksonville *Times*, April 24: Miners have again been made happy. The Jacksonville quartz mill is again at work. Considerable prospecting is still going on everywhere. The miners of Josephine county are busier than ever. The snow now lying on the high hills will keep up the water for some time yet. J. N. Castel has the Jacksonville Mining and Milling Co.'s tunnel in Timber Gulch nearly finished, and the prospects for plenty of good ore are favorable. Geo. Schumpf had several tons of quartz from his ledge in Willow Springs precinct tested at the Medford reduction works, and it milled from \$8 to \$12 a ton. John Miller who has extensive mining property on Farmer's Flat, finished cleaning-up a few days since, and is well satisfied with the past season's work. As he has much rich ground the yield of gold was considerable. A 16-ounce slug was recently picked up in Feldt & Co.'s claim on Althouse where so many big nuggets were found in former days. Wm. Felchly who is mining in the Red Dog district, Josephine county, is doing well having already cleaned-up several hundred dollars. The gold is mostly coarse, one piece weighing \$42.

The quartz mill at this place has been thoroughly overhauled, a larger engine procured to propel it, and crushing of ore from several ledges was resumed this week. We are quite certain that it will prove a success, if experienced mining men manage it. The heavy rains last week furnished the miners with a great amount of water, most of whom have as much as they had any time during the winter. Unfortunately a number of them were so far along with their work that they are unable to make the most of it. The others have resumed piking and ground-sluicing, however. Bybee & Hall have struck the pay channel in their mine on Canyon creek, and are taking out considerable dust. While in Grant's Pass, last week, Mr. Hall showed us about \$600 of as pretty gold as we ever saw, lying nothing but smooth, bright pieces, ranging from 50 cents up to \$25. This claim promises to be one of the best in that county.

GRANITE CREEK.—Bedrock *Democrat*: Prospectors are entering the Granite Creek country and making locations of quartz discoveries. Mr. Chas. S. Miller, of Monumental fame, arrived in our city last Sunday from the Granite Creek mining district and reports having re-located a valuable discovery of quartz on Greenhorn mountain, six miles west of Robinsonville. He intends returning to his claim in a few days and will put a couple of men to work at once developing. Mr. Miller is a mining man of experience and his judgment of mines is seldom wrong, and from the way the gentleman speaks of his discovery and the Granite country in general, we are led to believe that there is a great future in store for this portion of our country. A gentleman by the name of Boyd formerly of Wood River made several locations on this mountain, one of them an extension of the Miller claim, and is pushing the work of development as fast as possible. Mr. Boyd is the possessor of milling machinery in the Wood river country, and it is his intention at the present time to have the same shipped from there and placed on one of the ledges. Placer mining has started up this spring under very favorable circumstances and a large output of the precious metal is confidently expected.

UTAH.

REVIEW.—Salt Lake *Tribune*: The week has been stormy, with the inevitable bad roads, hindering ore shipments. The most notable event of the week has been the arrangement to start up the Mammoth mine at Tintic again. Mr. John F. Reese, an experienced handler of copper ores, to have charge of the treatment of the ore, for which purpose he will put up immediately a calciner. During the week ending the 21st instant, inclusive, there was received in this city \$23,999.37 in bullion and \$19,879 in ore, a total of \$143,878.37. The previous week there was received an aggregate of \$183,920.48 of which \$133,510.87 was bullion and \$50,409.61 was ore. The output of the Ontario for the week was 28,623.40 fine ounces; no ore sales. All is going on smoothly at the Ontario. The Daily produced during the week seven bars of bullion, 10,489.71 ounces, no ore sales. The base bullion receipts as reported day by day foot up for the week \$15,610; the fine bars \$31,771.00. The product of the Hanauer for the week was \$30,800. Of the Germania, four cars, \$10,647.83. Of the Pascoe, \$2030. The Stormont sent up \$350 in fine silver on the 19th. The Horn Silver remains locally quiet; no news from it. A small force is being worked but the output is insignificant.

STAR DISTRICT.—Cor. Salt Lake *Tribune*, April 24: The mining interests are all looking up. The whim on the Wild Bill mine has been completed. Shipments are now coming in from different mines and ores are being received from southeastern Nevada. The concentrating mill here is doing good work. The Monitor mine, South Camp, is showing up well, and most of the silver lead ores carry gold from \$10 to \$15 per ton, but should the tariff on lead be removed this gold could never be obtained. The Hickory, Adelia, Florence, Rebel, Jim Keene, Miner's Dream, Mammoth, Elephant, Burning Moscow, Creedmore and Talisman are shipping ores, and there is no end to the mineral wealth yet to be uncovered in this old and reliable district. The Cave mine in Bradshaw district is looking better, and shipments of ores from Beaver Lake district are being made.

THE CHRISTY.—Southern Utah *Times*, April 20: Everything is running smoothly at the mill and mines. Forty-five tons of company ore was crushed this week. The New Shaft continues to show up big.

THE STORMONT.—The outlook at the mines promise a fair month's run. Forty tons per day, of a better grade than has been mined for some time, was hauled to the mill last week. The stopes on five south, are prospecting well and furnishing a good grade of ore.

THE NEW LEACHING WORKS.—The soda which was delayed by the railroad strike in the east and bad roads between here and the Terminus, finally arrived last Tuesday and the leaching works were put in full blast again on Wednesday morning.

OTHER NOTES.—Taylor & Lampson shipped twenty-eight tons from the Leeds mine to the Christy mill, this week. Van Hagen, Goodman & Lawson, had twenty tons of Honest Miner ore crushed at the River mill this week.

AT THE MARSAC MILL.—Everything is moving on to the entire satisfaction of all concerned. About fifty men are employed there and all are doing good work. During the past week on an average of forty-five tons of ore per day was received from the Daly mine.

THE ROCK ISLAND mine looks well and Messrs. Volton, Sturridge & Co., are correspondingly happy. The stopes in the 200-foot level are producing a great deal of ore and about 200 tons of \$75 mineral is monthly shipped from the mine. Arrangements are being made to erect a new steam hoist in the mine.

THE MOULTON.—This is one of the best mines in the camp, and will remain so for years to come. Superintendent J. K. Clark reports everything in and around the mine to be in first-class condition. The ledges on the 700-foot level will soon be encountered, and the stopes in the 500, 400 and 300-foot levels are producing as usual. The splendid mill is in excellent condition and working regularly

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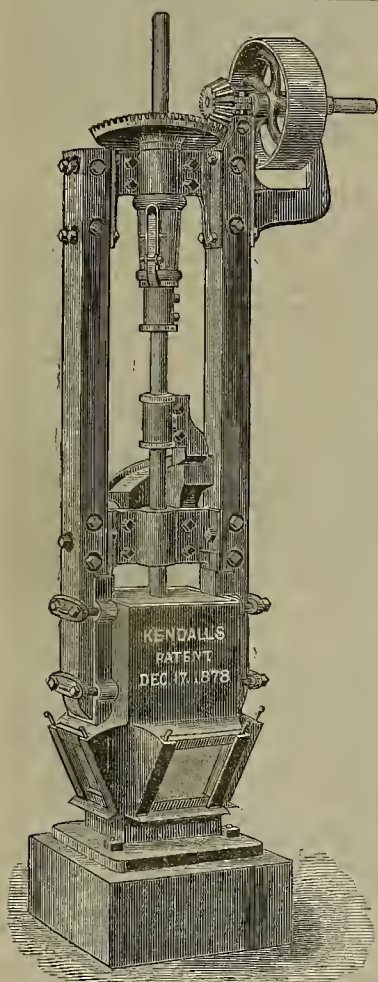


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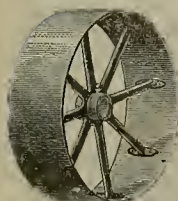
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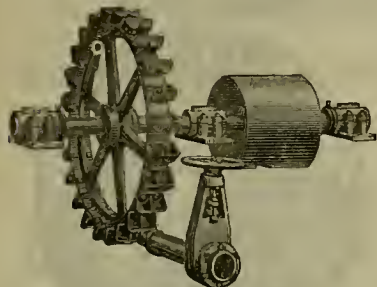
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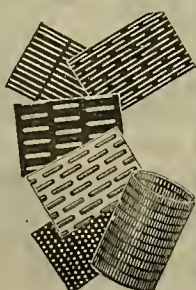
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340,122.—HORSE HAY RAKE—Byron Jackson, S. F.

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NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Mining Share Market.

Mining stocks show no special improvement, nor will they unless something shows up on the Comstock of a very favorable nature. The present work on the lowest levels in Norcross and Chollar is watched with interest, for in case of a failure there it will stop further deep prospecting on the Comstock. The *Enterprise* says there is no present indication of such failure. On the contrary, the Hale & Norcross is looking substantially better and more promising than it has in the past year in its ore bonanza prospects, especially on or above the 3000. The main lateral drift south from Chollar, being carried through the Potosi ground, is showing very encouraging indications. This drift is running through a very interesting section. Nothing is known of the mine below the 2400 level; therefore, this drift is in a solid block of virgin ground, 700 feet deep, 700 feet long and of unknown width, showing room enough for a bigger bonanza than has yet been found in the Comstock at any point. Of course, all depends upon what may be developed in crosscutting east, as this drift is being run along the west side of the ore vein, and will be so continued through to the Bullion line, owing to the favorable formation the drift is being run in. No decisive movement toward sinking the Combination shaft deeper, or the resumption of deep explorations in Hale & Norcross, need be looked for or expected until this Potosi drift is completed, which will probably be in about six weeks.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Moulton, April 19, \$17,600; Odessa Mill, 25, \$3,800; Barber's Mill, 25, \$2,500; Holberg & Co., 25, \$1,500; Alice, 17, \$45,483; Moulton, 17, \$18,656; Lexington, 17, \$50,496; Silver Bow, 17, \$10,060; Moulton, 23, \$20,208; Alice, 20, \$12,400; Hanauer, 20, \$10,810; Stormont, 20, \$3,250; Germania, 23, \$2,612; Alice, 23, \$16,055; Hanauer, 23, \$4,980; Queen of the Hills, 23, \$1,160; Kentuck, 24, \$16,000; Hanauer, 25, \$12,280; Pascoe, 25, \$1,750; Queen of the Hills, 25, \$1,150. For week ending April 25, Wells, Fargo & Co., of Salt Lake, shipped \$48,947 in bullion; McCormick & Co., \$47,920; T. R. Jones & Co., \$15,735; and Union National Bank, \$31,275. The Salt Lake output of base metals for the week ending April 24 was: Base bullion, 24 cars, 603,203 pounds; matte, 7 cars, 225,130 pounds; copper ore, 2 cars, 66,050 pounds. Total, 33 cars, 904,383 pounds.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco:

UNION ELECTRIC CONDUIT CO., April 23.—Object, the construction of a system of underground conduits for the distribution of electricity. Capital stock, \$100,000. Directors—P. T. Dickinson, A. B. Hull, R. P. Clement, A. Everett Ball and J. M. Morehead.

TRUCKEE LUMBER CO., April 27.—Object, to conduct a general lumber business on this coast. Capital stock, \$50,000. Directors—E. J. Brickell, Spokane Falls; W. H. Kruger, Truckee; F. H. Horton, J. S. Maguire, San Francisco; W. A. Donaldson, Oakland.

GREY EAGLE MINING CO., April 27.—Location, Nevada. Capital stock, \$100,000. Directors—William Goldstein, Leopold Attenburg, J. J. Weglieu, Adolph Steinberger and Charles Attenburg.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. J. BARTLETT—Amador and Calaveras Co's.
E. W. INGALLS—Arizona.
E. L. RICHARDS—San Diego Co.
R. G. HOSFORD—Idaho and Montana.
Geo. McDowell—Santa Clara and Santa Cruz Co's.
J. B. PATCH, Nevada and Utah.
L. D. CLARK, Tehama and Shasta Co's.
M. S. PRIME—Alameda Co.
E. O'FLAHERTY—Butte Co.
M. D. SHARRER—Alameda Co.

A word to the wise: Use Muller's fine pebble water-calcies; 135 Montgomery St., n'r Bush.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from advertisements in Mining and Scientific Press and other S. F. Journals.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Buena Vista Petroleum Co.	California.	33.	1 60.	Mar 16.	Apr 20.	J. Moritz.	328 Montgomery St.	
Don Amador M Co.	California.	11.	1 00.	Apr 7.	May 10.	F. B. Latham.	327 Pine St.	
Crocker M Co.	Arizona.	2.	20.	Mar 10.	Apr 13.	A. Waterman.	309 Montgomery St.	
Champion M Co.	California.	21.	10.	Apr 13.	May 15.	J. Wetzel.	322 Montgomery St.	
Eureka Con M Co.	Nevada.	9.	1 00.	Apr 20.	May 31.	E. H. Wilson.	328 Montgomery St.	
Grand Prize M Co.	Nevada.	16.	40.	Apr 9.	May 17.	J. R. Grayson.	327 Pine St.	
Gold Point Con M Co.	California.	9.	01.	Mar 20.	Apr 24.	A. B. Brady.	Grass Valley	
Gould & Curry M Co.	Nevada.	52.	02.	Mar 27.	Apr 30.	A. M. Durbrow.	309 Montgomery St.	
Lucky Hill Con M Co.	Nevada.	3.	05.	Apr 5.	June 7.	F. D. Durbin.	27 Ellis St.	
McMillen S M Co.	Arizona.	6.	20.	Apr 9.	May 14.	J. J. Moritz.	323 Montgomery St.	
Martin White M Co.	Nevada.	21.	25.	Mar 16.	Apr 20.	J. J. Moritz.	309 Montgomery St.	
Manhattan M Co.	California.	9.	01.	Mar 20.	Apr 24.	A. B. Brady.	Grass Valley	
North Banner Con M Co.	California.	11.	13.	Apr 3.	May 6.	J. J. Mitchell.	Grass Valley	
Pennsylvania M Co.	California.	4.	01.	Mar 22.	Apr 4.	M. B. Byrne.	Grass Valley	
Potosi M Co.	Nevada.	23.	30.	Apr 16.	May 20.	J. C. Elliot.	309 Montgomery St.	
Pear M Co.	Arizona.	5.	10.	Apr 13.	May 20.	A. Waterman.	309 Montgomery St.	
Santa Anita M & M Co.	California.	9.	02.	Mar 31.	Apr 27.	A. M. Durbrow.	309 Montgomery St.	
Silver Hill M Co.	Nevada.	23.	10.	Apr 21.	May 27.	W. E. Dean.	309 Montgomery St.	
Union Con M Co.	Nevada.	33.	25.	Apr 19.	May 26.	J. M. Buntington.	309 Montgomery St.	

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Anglo-Mexican M. Co.	Mexico.	C. A. Moore.	217 Sansome St.	Annual.	May 6
Con Imperial M. Co.	Nevada.	C. L. McCoy.	329 Pine St.	Annual.	May 9
Morgan M. Co.	California.	C. S. Neal.	230 Montgomery St.	Annual.	May 1
Purissima Oil Co.	California.	W. Clements.	318 Front St.	Annual.	May 1
Ruby M. Co.	California.	F. Fickler.	320 Sansome St.	Annual.	May 4
Russell Redden M. Co.	California.	E. E. Elliot.	323 Montgomery St.	Annual.	May 4
Santa Yuba M. Co.	California.	W. E. Lutz.	Merchants Exchange.	Annual.	May 4
San Jose De Gracia M. Co.	Mexico.	C. A. Morse.	217 Sansome St.	Annual.	May 3

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Caledonia M. Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Feb 23
Con Virginia & California M. Co.	Nevada.	A. W. Havens.	309 Montgomery St.	30.	Feb 23
Derbac Blue Gravel M. Co.	California.	T. Wetzel.	322 Montgomery St.	10.	Feb 9
Holmes M. Co.	Nevada.	E. E. Elliot.	323 Montgomery St.	25.	Mar 20
Mono M. Co.	California.	G. W. Sessions.	359 Montgomery St.	25.	Mar 10
Manhattan S. M. Co.	Nevada.	John Crockett.	419 California St.	25.	Feb 17
Silver King M. Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar 15

PACIFIC COAST WEATHER FOR THE WEEK.

[Furnished for publication in this paper by NELSON GORUM, Sergeant Signal Service Corps, U. S. A.]

DATE.	Portland.			Red Bluff.			Sacramento.			S. Francisco.			Los Angeles.			San Diego.									
	Rain.	Temp.	Weather.	Rain.	Temp.	Weather.	Rain.	Temp.	Weather.	Rain.	Temp.	Weather.	Rain.	Temp.	Weather.	Rain.	Temp.	Weather.							
Apr. 21-23.																									
Thursday .....	.00	58	NW	Cl.	.00	73	N	Cl.	.00	60	NW	Cl.	.00	60	W	Fr.	.00	63	SW	Cl.	.00	62	W	Cl.
Friday .....	.00	53	NW	Cy.	.00	76	NE	Cl.	.00	71	NW	Cl.	.00	61	W	Cl.	.00	63	W	Cy.	.00	61	W	Fr.
Saturday00	62	NW	Cl.	.00	77	SE	Cl.	.00	69	S	W	Cl.	.00	62	SW	Cl.	.00	69	W	Cl.	.00	62	NW	Cl.
Sunday .....	.00	69	NE	Cl.	.00	61	N	Cl.	.00	71	W	Cl.	.00	61	W	Cl.	.00	63	W	Cy.	.00	61	NW	Cy.
Monday .....	.00	63	SE	Cl.	.00	62	N	Cl.	.00	70	W	Cl.	.00	56	W	Cl.	.00	61	W	Cy.	.00	62	NW	Cy.
Tuesday00	54	NE	Fr.	.00	78	N	Cl.	.00	65	SW	Cl.	.00	59	SW	Cy.	.00	61	SW	Cy.	.00	61	S	W	Cy.
Wednesday .....	.00	57	NE	Cy.	.00	69	S	Cl.	.00	62	SW	Fr.	.00	58	SW	Cy.	.00	63	W	Cy.	.00	66	SW	Cy.
Totals .....	.00				.00				.00				.00				.00				.00			

EXPLANATION.—Cl. for clear; Cy., cloudy; Fr., fair; Fy., foggy; — indicates too small to measure. Temperature Wind and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

New York Metal Market.

Telegraphic advices dated April 20th give the following New York prices:

BORAX—63¢ @ 7¢ c.
BAR SILVER—\$101 per oz.
COPPER-LAKE—\$11.50 @ 11.62½.
IRON—No. 1, \$17 @ 16; No. 2, \$16 @ 16.50.
LEAD—\$4.85 @ 4.95.
QUICKSILVER—43 @ 43½ c. @ lb.

The following is the latest from the "New York Metal Market Report":

COPPER—Nominal; Lake offered at 11.50c. Transferable Notices (Lake) offered at 11.40c. Transferable Notices (Chill Bars) offered at 11.15c.

LEAD—Easy at 4.65 @ 4.80c. Transferable Notices (Domestic) issued at 4.72½c.

SPELTER—Steady at 4.45 @ 4.70c. Transferable Notices (Domestic) issued at 4.47½c.

TIN—Quiet and steady at 20.65c @ 20.75c. After 2d Call, 25 tons Straits May sold at 20.70c. Transferable Notices issued at 20.70c.

TIN PLATE—Neglected. Transferable Notices issued at 14.37½c.

IRON CERTIFICATES—Dull and unchanged. Transferable Notices (April delivery) issued at 17.

MAKERS PRICES—At idewater, 100 ton lots of listed irons (when brand is specified) range nominally as follows: Lehigh, Grade No. 1, \$18 @ 19.50; No. 2, \$16.50 @ 17.50; Grey Forge, \$15.50 @ 17. Hudson River, Grade No. 1, \$18 @ 19; No. 2, \$16.50 @ 17.50; Grey Forge, \$15.50 @ 16.50. Southern, Grade No. 1, \$18.50 @ 19; No. 2, \$17 @ 17.50; Grey Forge, \$16 @ 17.

San Francisco Metal Market.

[WHOLESALE.]

	THURSDAY, APR. 23, 1886.
ANTIMONY—Per pound.	— @ —
Hallet's.	12 @ —
Holbrook's.	13 @ —
Borax—San Bernardino.	— @ 8
Armagosa.	— @ 61
IRON—Glengarnock ton.	22 50 @ —
Eglinton, ton.	20 50 @ 21 50
American Soft, ton.	24 00 @ —
Oregon Pig, ton.	— @ —
Clippers Cap, Nos. 1 & 4.	22 00 @ 23 50
Clay Lane White.	22 50 @ —
Shots, No. 1.	23 50 @ —
Steel—English, B.	13 @ —
Black Diamond, ordinary sizes.	13 @ —
Pow.	5 @ 6
Machinery.	8 @ 10
Sanderson Bros.	13 @ —
COPPER.	
Brazers' sizes.	17 @ —
Fire-box sheets.	20 @ —
Bolt.	17 @ —
Shedding.	— @ —
Ingot.	13 @ 14
LEAD—Pig.	4 00 @ 4 50
Bar.	4 @ 4 42
Pipe.	8 @ —
Sheet.	8 @ —
Shot, discount 10% on 500 bag.	1 85 @ —
Buck, 3/4 bag.	2 05 @ —
Ohilled, do.	2 25 @ —
ZINC—German.	— @ 10
Sheet, 72 1/2 to 10 lb, less the charge.	7 @ —
QUICKSILVER—By the flask.	— @ 33 00
Flasks, new.	1 05 @ —
Flasks, old.	85 @ —
TEMPERATURE—Coke.	5 1/2 @ 5 40
Charcoal.	5 15 @ 6 25

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR. 3.	WEEK ENDING APR. 15.	WEEK ENDING APR. 22.	WEEK ENDING APR. 19.
Alpha.....	.15	.65	.65	.85
Ala.....	.25	.30	..	..
Andes.....	..	..	.25	..
Argenta.....	..	..	..	..
Belcher.....	..	1.10	1.10	1.10
Belling.....	..	..	..	..
Bele & Belcher.....	1.20	1.25	1.40	1.35
Bullion.....	..	.30	.30	.45
Bonanza King.....	..	..	..	..
Belle Isle.....	1.00	1.25	1.10	1.05
Bodie Con.....	1.00	1.25	1.10	1.15
Benton.....	..	..	..	..
Bodie Tunnel.....	..	..	..	..
Bulwer.....	.60	.70	..	.80
California.....	2.10	2.25	2.10	2.15
Challenge.....	..	..	..	..
Chollar.....	.90	.93	1.00	.85
Confidence.....	..	1.10	1.25	..
Con. Imperial.....	2.10	2.25	2.10	2.15
Con. Virginia.....	2.10	2.25	2.10	2.15
Con. Pacific.....	..	.30	.30	.20
Crown Point.....	1.10	..	.90	.85
Day.....	..	..	..	..
Eureka Con.....	1.55	1.55	2.05	1.35
Eureka Tunnel.....	..	..	..	..
Exchequer.....	..	..	..	..
Grand Prize.....	..	..	..	..
Gould & Curry.....	.70	.75	.70	.80
Goodshaw.....	..	..	..	..
Hale & Norcross.....	7.00	7.5	5.00	7.5
Holmes.....	..	..	..	..
Independence.....	..	..	..	..
Julia.....	..	..	..	..
Justice.....	..	..	..	..
Martin White.....	..	..	..	..
Mono.....	1.95	2.30	2.25	2.30
Mexican.....	.60	.55	.50	.55
M. T. Diablo.....	..	..	..	..
Northern Belle.....	..	..	..	..
Navajo.....	15	75	11	10
North Belle Isle.....	..	..	..	..
Occidental.....	..	..	..	..
Ophir.....	.78	.85	.75	.80
Orphan.....	..	..	..	..
Potosi.....	.54	.60	.60	.75
Pinal Con.....	1.10	1.20	1.10	1.20
Savage.....	..	..	..	..
Sag. Belcher.....	..	..	..	..
Sierra Nevada.....	.45	.50	.45	.80
Silver Hill.....	..	..	..	..
Silver King.....	..	..	..	..
Scorpion.....	..	..	..	..
Syndicate.....	..	..	..	..
Tigra.....	..	..	..	..
Union Con.....	.40	.41	.40	.30
Utah.....	..	..	..	..
Yellow Jacket.....	.70	.90	.65	.75

Sales at San Francisco Stock Exchange.

THURSDAY A. M., APR. 23.	40	Hale & Nor.....	2.05
100 Alpha.....	60c	200 Holmes.....	2.25
50 B. & Belcher.....	95c	1000 Mexican.....	4.50
350 Bodie Con.....	1.30 @ 1.35	400 Mono.....	2.50
100 Bulwer.....	85c	170 Ophir.....	50 @ 25c
200 Benton.....	10c	100 Overman.....	25 @ 25c
100 Bullion.....	5c	700 Peerless.....	30c
150 Chollar.....	65c	100 Potosi.....	45c
200 Con Va & Cal.....	1.25	10 Silver King.....	75c
90 Crown Point.....	90c	100 Savage.....	95c
340 Gould & Curry.....	80 @ 85c	100 Sierra Nevada.....	30c

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

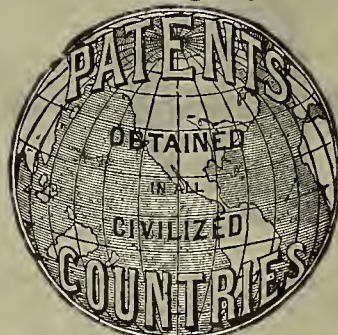
MOUNT WHITNEY.—Captain J. M. Keeler, of Inyo county, delivered two lectures this week at Masonic hall, Oakland, on Mount Whitney, and the surrounding region. The lectures were illustrated by stereopticon views, many of them very rare and beautiful. Captain Keeler's descriptions were instructive and interesting. There is a freshness about his method of description which is not of the usual order in such lectures. He gave a great deal of information about a region very little known, even to citizens of this State—a region, too, not so very far from our centers of population. Capt. Keeler should be encouraged in his efforts to show up the wonders of our State, and his efforts are worthy of large audiences. Inyo county is a wonderful one in scenic resources, and there is a large fresh field there for tourist travel.

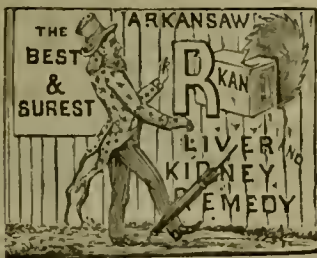
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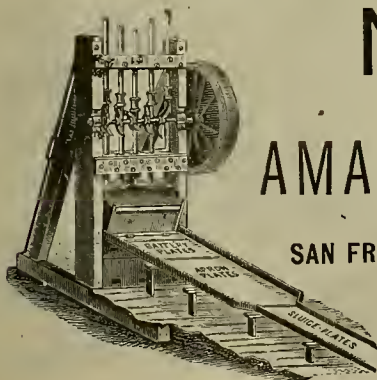
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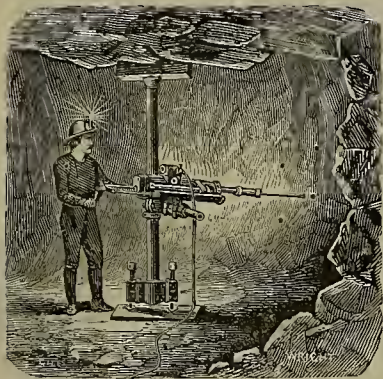
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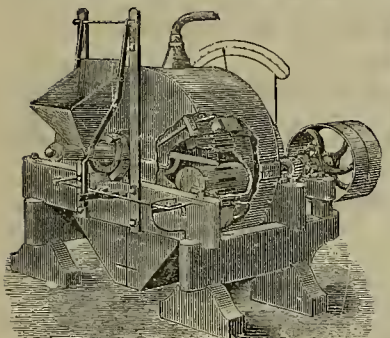
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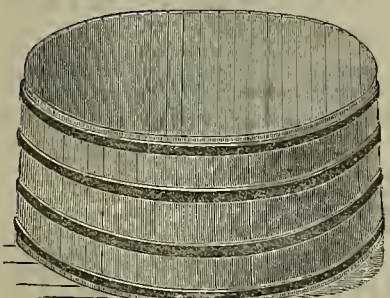
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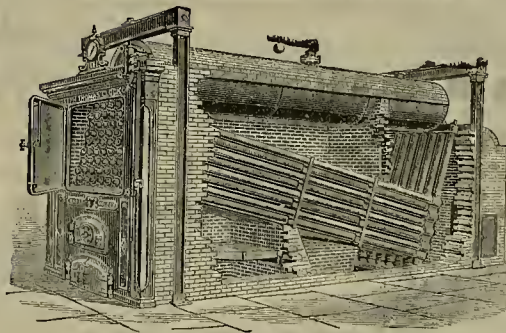
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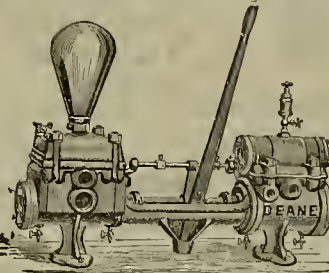
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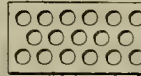
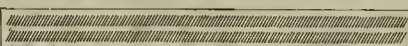
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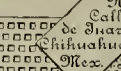
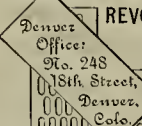
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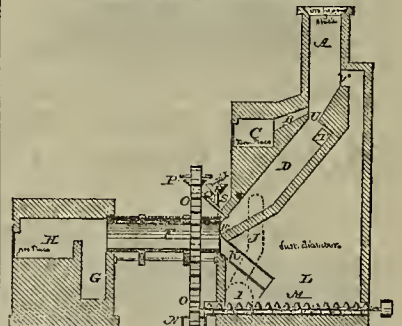
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A Continuous Furnace for Working the
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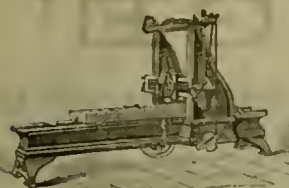
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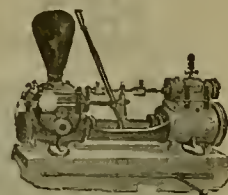
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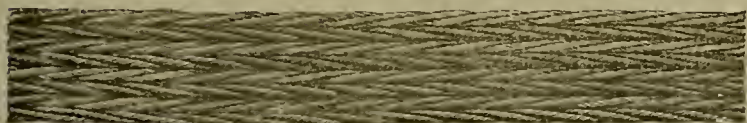
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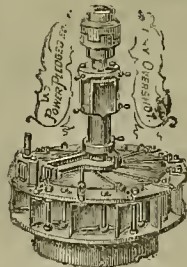
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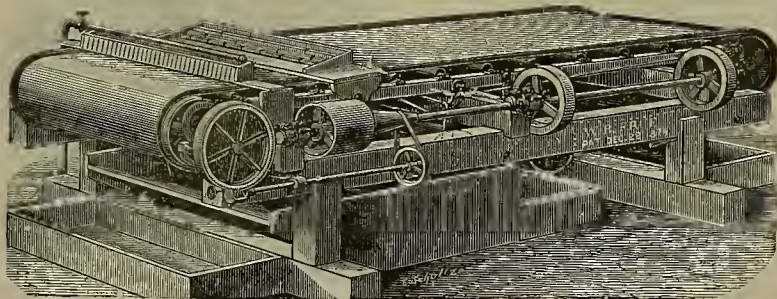
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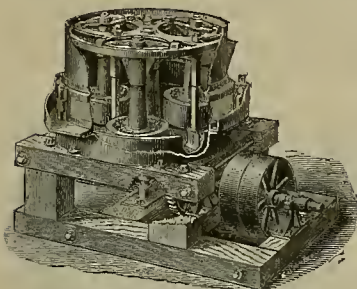
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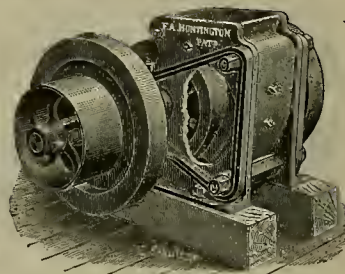
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Mining Machinery of Every Description,

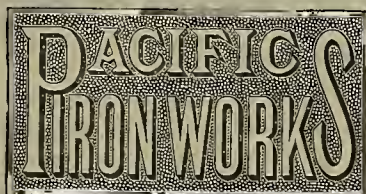
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For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all the AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



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Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 600 feet of five-eighths steel rope. SEND FOR CIRCULAR.



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Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

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E. G. DENNISTON, Proprietor.

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, MAY 8, 1886.

VOLUME LII
Number 19.

Working Low Beds of Gravel.

A few miles from Ione, Amador county, in this State, is the Arroyo Seco mine, which, as the Spanish name indicates, is in situated the bed of a "dry creek." The ground was known to be rich but all attempts to work it failed until J. P. Lambing took hold of the operation. The difficulty was there was no fall,

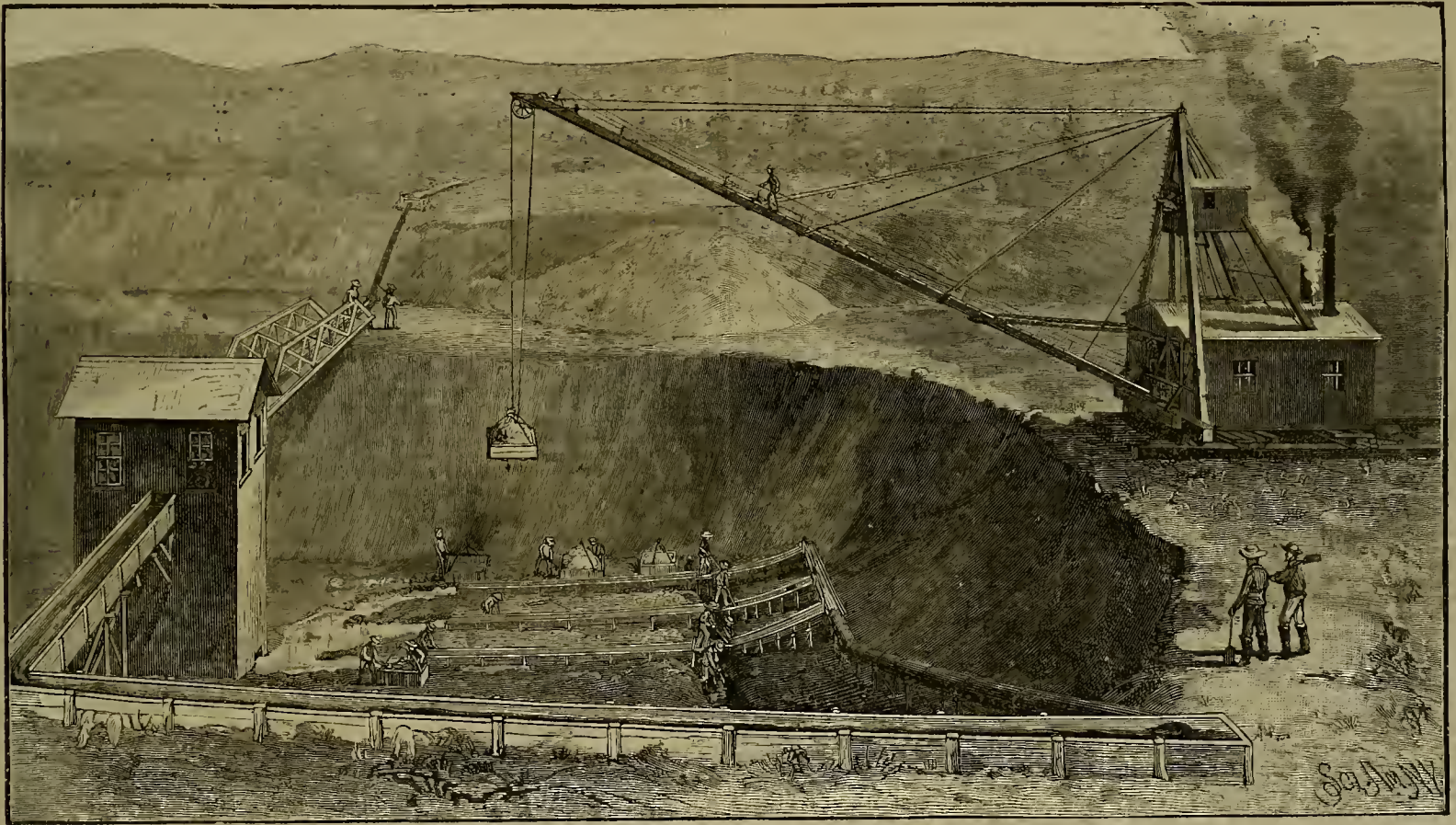
there were and ascertain prices, but resolved to have his made here. In addition to the engineer one man controls the movement of the bucket and derriok, and one man on the boom attends to the dumping.

The pay dirt is washed in sluices, as shown in the engraving. The tailings, small rocks, sand and water run into a general sump under the tall bonse shown in the accompanying en-

These 15-inch Knight Turbine wheels are giving great satisfaction. Mr. Lambing states that they were formerly running one No. 6 and one No. 8 vertical centrifugal pump with a 12-foot wheel of another pattern under 68 feet head, and 400 inches of water. They had to raise from 100 to 500 miner's inches 30 feet high, but the wheel required too much water, and the pumps so much oaro the present plant was substituted.

had from the East. This whole plant was made by Knight & Co., Sutter Creek, E. A. Rix & Co., agents, No. 20 Fremont street, this city. Miners who know of ground of a similar character to that described will do well to note the success achieved at Arroyo Seco.

TUOLUMNE MINES.—Another strike is reported from the Stanley mine, Tuolumne



MINING LOW GROUND WITHOUT FALL AT ARROYO SECO, CALIFORNIA.

and no way of getting rid of tailings. The pay dirt is about five or ten feet deep, and there is considerable stripping to do.

In order to get rid of the worthless top dirt, there is a large crane or steam derrick. The two engines to operate this are 9x16 inches, and there are two 48-inch upright boilers. They hoist from five to seven tons at a load, on the end of a boom 110 feet long. The dirt is hoisted 50 feet high, swung to one side and dumped, and the tub returned in one and a half minutes. The derrick-house containing the engines and boilers is on tracks laid on the ground so that it can be gradually moved up the creek as the claim is worked. With this derrick they can dump the "strippings" 110 feet on each side of the center, allowing the men to get at the pay gravel.

Mr. Lambing states that this hoist is much easier handled and controlled than those built by the Lakeport Derrick Co. builders who have the reputation of making the best, and it works in every way as well and in many respects better than those built in the Eastern States. Mr. Lambing went East to examine all

graving. Now these tailings and the water have to be removed as there is no fall and no way to get rid of them except to hoist them out of the way. This is accomplished in a very simple but ingenious manner.

In the sump are two submerged centrifugal pumps, of peculiar pattern, and designed for this particular work. Each has two 11-inch discharge pipes; the capacity is 600 miner's inches of water, or 900 cubic feet per minute. These pumps have no steps or bearings made under water, the whole weight resting on two 26-inch anti-friction wheels.

On the floor above these centrifugal wheels are two 15-inch Knight water wheels fed from the main supply pipe with 68 feet head. These wheels run the submerged centrifugal pumps below and raise the sand, gravel and water from the sump, throwing the whole debris and water into the flume seen issuing from the side of the pump-house. From this flume the gravel and rocks are shoveled out by men, the water is screened and again returned by a pipe, to be used in sluicing. Sixty-eight feet of water does the washing, pumping and all.

Mr. Lambing has been mining for the past 34 years and used all the wheels, but he now has five Knight wheels in use preferring them to others. This centrifugal double discharge pump will pump sand, gravel, chips, leaves, or anything that will pass through a three-inch mesh.

They have pumped up with the water sand and fine gravel as fast as two men could shovel it to the pump for hours at a time and raised it 36 feet high. These pumps have been in constant use for the past two years and it cannot be seen that they are any the worse for the hard usage, though the pumps brought out from the East wore out in five months doing the same work.

There is a large amount of mining ground throughout the Pacific Coast, similar to that at the Arroyo Seco claim, where the stripping is too deep to admit of working by the old process, but which can be perfectly worked by using these powerful steam derricks to remove the strippings. It is fortunate for the mining interests that these can be built here at the mines and at no greater cost than they can be

county. In a few days they are stated to have taken out \$7000 from the feeders running into the mother lode. The first big strike was made in 1882, when the owner took out \$11,000 in a few days. In 1885 the owner took out \$20,000 or more with arastra and hand mortar. This mine joins the Tuolumne and Willetta mines, which are reported as bonded to an English syndicate, for the round sum of \$150,000. A big ditch is being brought from the Tuolumne river, with the exclusive right of 3600 miner's inches. This ditch, as surveyed, will furnish plenty of water at the mill site for 500-horse power, by using Leffel's vertical mining wheel. The region thereabouts is active and promising.

NINE cargoes of coal came to this port from Puget Sound last month. Of these, five were from the Carbon Hill mine, two from the Black Diamond, one from the South Prairie and one from Seattle.

The quantity of coal now on the way to California is unusually large, especially from Australia.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eps.

South Fork Mining District, Shasta County.

EDITORS PRESS:—This district, named after the South Fork of Clear creek, lies in the foothills of the Coast range, about 20 miles west of Redding and 18 miles west-north-west from Anderson on the California and Oregon railroad, this being the stopping place for passengers and freight coming in from San Francisco. A good deal of placer mining was in times past carried on here and something is still being done in that line, mostly now by the hydraulic process. Quartz mining is at the present day, however, the principal branch of the business. There are two classes of ore here, the base and the free milling, the former, rich in silver, requiring to be treated by roasting or smelting, while the latter, which contains only gold, can be worked by the most cheap and simple methods, most of that heretofore handled having been reduced in arrastras.

The Gold Bearing Ore

Is found mostly in small seams of quartz running through the country and uniting with the larger veins at all angles. It is an ochreous ore, being composed chiefly of the oxide of iron. The gold is very pure and so entirely free that 95 per cent of it can be collected by simply crushing and washing in water. There are, perhaps, a dozen arrastras in the district running on this ore, which yields at the rate of about \$20 to the ton. These arrastras are driven by water and crush from one to one and a-half tons of ore per day. These seams being so narrow, usually from one to three inches thick, a great deal of barren rock has to be removed to get a little ore, rendering its extraction costly. Nevertheless, a good many miners have made fair wages working these small ochreous veins, the number of which is very great. They do not, however, penetrate to any great depth, rarely more than 40 or 50 feet below the surface. They are found sometimes traversing the upper portion of the larger veins as well as the country rock, and were obviously the sources of the placer deposits in this region. Though worked extensively for more than 20 years not a tenth perhaps of these small veins have yet been exhausted.

The Base Metal Lodes.

Nearly all the large lodes in this district except in the southerly portion, are silver bearing. The silver ore as a general thing is base, containing more or less iron and copper pyrites, sulphurets of zinc and antimony, galena, etc. The most of it is, however, of high grade, carrying from forty to sixty dollars per ton in silver and some gold. Considerable quantities of this ore have in times past been extracted and disposed of, some of it having been worked in mills here and some sold to the agents of various reduction works or shipped to markets abroad.

However disposed of, the returns have seldom proved satisfactory to the mine owners, who, on an average, have failed to get more than 30 per cent of what their ore was known to contain. Not only so, but adventurers coming into the district professing to be able to work the ore, have, after extensively sampling the mines, made a hasty departure, taking all the bullion they managed to extract with them. From all accounts the miners have fared badly at the hands of most parties with whom they have had dealings. Add to this the fact that the mills put up in the district have never succeeded in handling these ores successfully, and it is not at all strange that the business of mining remains here in a generally depressed and backward condition, notwithstanding the ore is mostly of high grade and developments show it to be present in great quantity in the mines. The lodes here have not been exploited to any great depth, the work being done by means of short tunnels, open cuts and shafts sunk in the vein matter. None of the tunnels cut the lodes at a depth of more than two or three hundred feet below the croppings, nor do any of the shafts reach a depth of more than eighty or ninety feet. Where intersected several of the veins show large bodies of ore, the most of them from two to three feet in thickness.

Geology and Vein System.

The country here consists of slate, granite, and porphyry, the granite occupying the middle of the belt, with the slate below to the east, the porphyry coming in higher up the mountain to the west. These formations run with the veins south 10 to 30 degrees west; the whole system pitching to the east, at a high angle, usually about 50 degrees. While the most of the lodes stand isolated in the country, others occur in broad ore channels, some of which carry several parallel veins. The contents of these channels aside from the ledge matter consists of decomposed quartz, all more or less metalliferous, clay, talc, porphyry, etc. That much of this material standing in these channels between the regular veins will pay for working, seems probable.

The More Important Mines.

Or those at least on which the greatest amount of work has been done in the vicinity

of the South Fork, commencing lowest down, are the following, viz.: the Black Diamond, occupying a fissure over a hundred feet wide, lying at the time of contact between the granite and the slate. The location covers two well defined parallel veins standing about 30 feet apart and showing regular clay lined walls. Three shafts have been sunk near the middle of the claim, one to a depth of forty and the other two to a depth of 80 feet each. They show the veins at these levels to be about four feet thick, three-fourths of the ledge matter consisting of ore that assays over \$100 per ton, and will probably yield by working process fifty to sixty dollars on an average. The hoisting and pumping here was done by water taken from the South Fork and delivered on an overshot wheel. The machinery is still in place though no work has been done on this mine for several years by reason of the refractory character of the ore, some of which was worked in a small cannon-hall mill standing near by. This mill so slimed the sulphurets that it was found impossible to save them with the Frue machine provided for the purpose. Other mills and concentrators are now about to be tried, but whether or not they will do any better work remains to be seen, though it is confidently believed that they will. This mill is also propelled by water taken from the South Fork, being a part of the water franchise that goes with the Black Diamond property.

This great contract fissure is taken up for a distance of three or four miles to the south, there being a great many valuable claims along it. Among the more promising of these are the South Extension of the Black Prince; the Crystal; the South Extension of the Crystal, the Arizona, the Confidence, and the Cincinnati, all of which make a fine exhibit of ore for the work done upon them.

Going up the creek one mile above the Black Diamond, we arrive at

The Chicago Mine and Mill,

Where more work has been done and a greater amount of improvements made than at any other point in the district. Here a ten-stamp water driven mill, furnished with concentrators, roasters, etc., was put up many years ago. Though a great deal of ore taken from the mine has first and last been worked here, the business has on the whole been a losing one, it having been impossible to save even one half of the silver the ore was known to contain. Both the mine and the mill have for several years past been idle, nor do the owners propose starting up either until some better plan has been found for working the ore. The ledge here which has been opened to a depth of 400 feet, carries all the way down a body of good ore fully four feet in thickness.

A little to the west of the Chicago another powerful vein was a few years since opened to a considerable depth and equipped with a first class mill. A short run on the base ore from the mine terminated the life of the enterprise, now in the same condition as its neighbor.

Journeying on up the South Fork,

We pass Strong's ranch, a beautiful place with vines, berries and fruit trees of every kind. Here also are mines belonging to the owner of the ranch, but, with the exception of the small free gold quartz seams, they are not now being worked. But like hundreds of others in the district they will be hereafter. A little further up we come to Ballou's place, where an arrastra is being run on the ochreous ores and some money being made. Ballou, to adopt one of the provincialisms here in use, wisely abstaining from "bucking at the base ore proposition," though owner of divers and sundry mines of this class. There is, in fact, hardly a resident of the district but can boast proprietary interests of this kind. Quarter of a mile further up at Meek's place another arrastra is being run here also on the same kind of mineral and with good results. Meek, lately deceased, was owner of a very valuable series of lodes, situated on the north side of the creek and a little higher up the mountain.

Another quarter of a mile further up brings us to the mill of the Chico Company now nearly completed.

The Mines of the Chico Company,

Lying on either side of the South Fork a short distance above. This is the live company of the district, being almost the only one that is just now spending much money here. The company is made up of active, energetic men, all miners of long experience and every one of them on the ground exerting himself to solve the problem that has here so long barred the way to success. That they will accomplish this end and that right speedily, I have not the least doubt. The mill, one of the Redstone patent, will be running in a few days. It is furnished with a Duncan concentrator and driven by water taken from the South Fork, the flow of which the company have a right of enough water to drive 50 stamps if required, the capacity of the present mill being about 15 stamps.

The company's mines in this part of the district consists of the Dayton and the Dayton North Extension; the Chico, the Chico North Extension and the Florence. The Dayton, the Chico and the Chico Extension, have been opened up to a depth of several hundred feet below the highest croppings on these veins, but little work having been done on the other claims. Large bodies of extremely rich ore have been developed here, assays of average

rock showing over a hundred dollars in silver to the ton, the selected running up into the thousands. Some of this ore is of the chloride variety and free milling. The bulk of it, however, is base, though the veins carry in places notable quantities of native and ruby silver. Where opened up, the ore bodies, at depths varying from 40 to 80 feet, are from 2½ to 3½ feet in thickness, compact and shapely. There are hundreds and perhaps it might justly be said thousands of tons of rich ore in sight here. A few rods further up the canyon are situated

The Mill and Mine of the Centennial Company,

Which, some six or seven years ago, made a large expenditure in opening their principal ledge and supplying it with what was then considered a suitable plant, the establishment consisting of a 5-stamp mill, rock breaker, roasting furnaces, etc. After roasting the ore here an attempt was made to extract the metal by the leaching process, which, having proved a failure, the works were shut down and have so remained since, but little ore having meantime been taken from the mines. The trouble here seems to have been the incompetence of the metallurgist in charge, lack of practical skill in this department of the business having in fact been the chief cause of disappointment throughout. The ores here are not specially base, nor are they otherwise much different from the class to which they belong found elsewhere, and which being successfully worked elsewhere, it is fair to presume they will sometime, and no doubt very soon, be successfully worked here. When that day arrives this district will become a great producer of bullion, as they have here not only the ore to make this possible, but all the natural facilities to insure cheap ore extraction and reduction.

Your editorial article in a late number of the Press on the subject of ore treatment by the new lixiviation process now practiced at the Lake Valley mines, New Mexico, has attracted notice and will be likely to greatly interest mine owners here, as promising a way out of the difficulties that have so long beset them. It is the many useful articles of this kind that appear in the Press that so recommends it to the mining public.

Natural Advantages.

The whole country here is covered with splendid forests of oak, cedar and pine, rendering the lumber and fuel supply cheap and certain. Water is abundant, several large streams flowing across the district, affording water for every needed purpose, the propulsion of machinery included. There is enough water here to drive 1,000 stamps in the summer, and an unlimited number at all other times. The deep canyons eroded in the sides of the mountains afford many eligible tunnel sites, while the decomposed granite favors the construction of roads and trails, many of which have already been built, leading to the principal mines in the district. The road leading from Anderson to the South Fork is so good that freight can be brought in from that place even in winter at less than \$10 per ton, the charge from San Francisco being only about \$15. The climate here is excellent and the soil so good that fruit of every kind can be grown to perfection and sold at lower prices than in the Sacramento valley. There being a great farming country close at hand, the staples of subsistence, the products of the dairy included, are cheap. Hay and grain can also be obtained in the mines at very moderate rates. Enjoying all these advantages, the business of mining in this country is bound to experience an early revival. The South Fork District is not dead, but sleeping.

PIONEER.

Xanthates.

Written for MINING AND SCIENTIFIC PRESS by C. H. AARON.

The xanthates, which I have taken the liberty of spelling with a Z in my books, otherwise xanthogenates, or, again, sulphocarbonates, offer a field for investigation which has been as yet but little explored, comparatively. I am not in a position to follow the subject up in a thoroughly scientific sense, but I have made some practical applications which perhaps deserve attention.

The volumetric assay of copper by means of potassium xanthate I have fully described heretofore in your columns, as well as in my book. The gravimetric assay, by the same reagent, has been merely touched upon. The former requires a certain amount of "skill and ability," also practice, and I find it is not a success in the hands of all. The latter may be easily executed by any one having a slight familiarity with chemical manipulation, and where copper assays are not of very frequent occurrence, is by far the more convenient.

The assay of copper by means of a xanthate is not so quickly made as that by the potassium cyanide process which is so much used at present and which is doubtless the best where assays are numerous enough to warrant the keeping in readiness of the apparatus and standard solution, where the ores are suitable and extreme accuracy is not required, but it is more rapid and less troublesome than electrolysis, which is, as I believe, equally accurate, or even, in certain circumstances, more so. In point of capacity of execution, it is about equal

to precipitation on iron or zinc, while far greater accuracy can be secured with less trouble and less skill.

Among the advantages of the method are:

First—A high molecular weight of the weighable product which contains only about one-third of its weight of copper. This admits of using a very small quantity of ore (or alloy) for the assay, one grain sufficing for the determination to less than one-tenth of one per cent, if a fine balance be at hand. The use of small quantities means economy in time and material.

Second—It is not necessary to remove nitric acid from the solution. (Difference from metallic precipitation.)

Third—Arsenic, zinc, manganese, nickel, earths or alkalis do not interfere. (Difference from the cyanide process.) Of all the substances which are liable to be present in the solution of the ore, as prepared, only cobalt, so far as I yet know, gives any trouble, and though cobalt sometimes exists in copper ores it is not of very frequent occurrence. Cobalt and nickel both interfere with the cyanide method. Tellurium would not be found in the solution; selenium I have not been able to try, but on general principles, and from analogy, I think it would be harmless.

Fourth—No special apparatus is required for the gravimetric modification, nor particular skill or experience, as with the volumetric and electrolytic methods.

In making this assay, I prefer to exclude lead and antimony from the first solution, though it may not be strictly necessary to do so; silver must be kept out. I therefore, as a general rule for ores, proceed as follows:

Digest 33 parts in any denomination of weight, or a simple multiple of that, as for example ninety-nine one hundredths of a grain, for which one grain may usually be taken as sufficiently accurate, of the powdered ore in a mixture of nitric, hydrochloric, and sulphuric acids in which the nitric is in considerable excess as compared with the hydrochloric, in a porcelain dish, with an inverted funnel as a cover to prevent loss by spurling, until the dense fumes of sulphuric acid come off. This takes but a few minutes in most cases. I use a small coal-oil stove for the work. If sulphuric fumes do not appear before dryness ensues, add more sulphuric acid; cool sufficiently and add a little water from a wash bottle, at first not removing the cover, afterwading rinsing that into the dish by the jet. Stir and warm for a few minutes, then decant on a coarse filter, receiving the liquid in a beaker. The solution is best not filtered very hot. Again add a little water to the residue in the dish; warm and filter. Complete the washing of the residue on the filter, receiving all the liquid, which need not be much, in the beaker. This first filtration may be omitted if the ore contains no silver, or not enough to make a material difference by its co-precipitation with the copper.

To the solution, filtered or not as above, add ammonia in some excess so as to dissolve all copper, and again filter, using a small, coarse filter for quick work, and wash with diluted ammonia as long as that passes with a bluetint.

To the ammoniacal solution of copper thus obtained add solution of potassium xanthate, while shaking or stirring, as long as that produces a (yellow) precipitate. Stir with a glass rod until the precipitate curdles and leaves the liquid clear on settling during a few seconds. It seems best to stir for a short time, then allow to stand for a minute or two, stir again, and so on till the liquid clears.

Filter through as small a filter as is convenient; wash three times with water at about 150 deg. F., and then, with a fine jet, wash the precipitate down from the sides to the point of the filter. Drain well and wash again with alcohol, dropping that on the edge of the filter, not disturbing the precipitate. At first, from dilution by the water in the precipitate, the alcohol will probably pass as a milky emulsion, then, as the water is displaced, it will clear. Continue until the drops from the filter no longer become turbid on dilution with water. (Test on a watch glass, etc.) Drain; dry on the water-bath or at heat of boiling water. Transfer from the filter to the weighing capsule.

If 33 parts of the ore were taken, the weight of precipitate in similar parts is the percentage of copper; or, the compound contains 33 per cent of its weight of copper. For practical work, if a grain of ore be used, one-third of the weight of the compound in hundredths of a grain is the percentage.

If the precipitate is well curdled before filtering, and well washed with alcohol at last, it will come off the filter cleanly enough for most cases, the small quantity remaining containing only about one-third of copper. If greater accuracy be desired, take two fine small filters, adjust them to equality of weight on a fine balance, place the one within the other and filter through both. After draining, remove the two filters from the funnel, separate them, unfold and lay them flat in a sheet of absorbent paper for a few minutes, then transfer them to the water bath for drying, and, in the weighing, place the empty one on the weight pan and weigh the precipitate on the other, filter and all.

In my next I propose to give some of the facts that I have been able to ascertain touching the reactions of the soluble xanthates on metallic solutions.

THE immigrant arrivals last week were about 8000, though but 5947 came to this city on emigrant trains, the remainder coming either first-class or stopping in other parts of the State.

To Miners Who Sharpen Their Own Drills.

Miners all over California are obliged by their situation to do their own sharpening, and while there are many who are good sharpeners and temperers, there are many more who are not. Probably very few understand the philosophy of working steel, and many will be glad to obtain some aid in the way of information as to how it should be done. The *Iron Trade Review* gives a few directions which are worth preserving. It says:

To work steel never heat above a light cherry red for hammering, then hammer light and quick until nearly black, as this improves the steel and will make tools that will do more than double the work than if not so treated. The hardness of steel is governed entirely by the heat when it is dipped in water; for instance, a piece of steel dipped at a bright cherry color and drawn in a straw will be very much harder than a piece heated to a dark cherry red and then dipped and drawn in a straw. Try it.

The forging, hardening and tempering of steel is an art that but few understand, as its knowledge is only gained by experience, and but few ever give its secrets to others; yet in a few words I will try to give the principal elements to workers of steel, which, if followed, will save you many losses, and give you a reputation for working steel that will insure you good and serviceable tools, as well as increase your gains.

Please remember that the heat at which steel is worked and hardened are two of the vital elements to produce good and serviceable tools. If heated above a light cherry red some of the vitality of the steel is destroyed, and it would in heating too many times return to iron. If heated too hot when hardening, it would fly to pieces, destroying your labor and steel, as well as give you a poor reputation.

Remember also to hammer your work lightly at a low heat, as this improves drills and edge tools most wonderfully, also take as few heats as possible, as overheating and too frequent heating reduces the steel to iron by destroying the carbon.

To harden drills, always dip them slowly to the depth desired in as near a vertical line as you can by the eye and hand, then move in a circular position until cold, but never any deeper in the water than first dipped, as this prevents them from cracking, which they would be likely to do if held perfectly still and the water formed a line around them. Do not change the water in which you temper, but as it wastes fill up the tank. If you are obliged to use fresh water always heat a piece of iron to put into it and bring it to such warmth as is perceptible to the hand, as steel is liable to crack when dipped in cold water. When you have heated your article to be tempered take it from the fire and examine to see if any flaws are observable in the steel, as this will prevent your having poor pieces of steel laid to your carelessness in hardening. In cutting up steel a thin, sharp chisel should be used, as a blunt one is liable to splinter or crack the bar, which will not be seen until it is tempered, when the labor is lost with the steel.

Alameda County Mining Interests.

Alameda county, which fronts on the bay where opposite San Francisco, has never been renowned for its mineral resources, but just now seem to be coming to the front. The *Livermore Herald* says: There is but little likelihood of an over-estimate, even in these days, when our attention is called thereto, of the mining possibilities of the Livermore mountains, when the operations are backed by brains and capital. We have been prospecting, by fits and starts, for 25 years, but with the exception of coal, there has been no discovery till within the last year, worthy of mention. The old prospectors sought for gold, silver, quicksilver and coal. They found traces of all these metals, but no quantity of any one. And had they struck a good mine, they lacked the capital and knowledge to develop it. Now, it is different. Practical men, backed by money, have taken hold of the matter, and at last these mining industries bid fair to be soon on a paying basis. Chrome already is, with our knowledge of the supply, increasing with every day. Our coal is excellent, and nearly ready for the market. The supply is almost without limit; and from present appearances our coal oil venture will prove a success. There is now every indication of striking a strong flow of oil within a week. If so, the company, which is amply able, will sink a dozen wells and pipe the oil to our town. We have other mines, which are in course of development, and bid fair to do well, and an intelligent prospect of our mountains is now in progress, during which it is most probable that other rich discoveries will be made. This all means business and growth for our town. We are just now beginning to realize the undeveloped resources of this section of country. The Indians saw here nothing valuable but the pine nuts and game; the Spanish cattle raiser appreciated the grass; the farmer came and found that he could grow wheat and barley and hay; another class saw our light lands and dry climate, and knew that here was the home of the vine; and now, men with practical knowledge of minerals are exam-

ining our hitherto worthless mountains and extracting wealth from the hoard of Mother Earth. Who will be the next to make a development of the resources of this favored spot?

The Sugar Pine of California.

In every practical sense and working quality it is equal to the white pine of the Eastern States—Susquehanna, Albany, etc., with the life herein noticed. It derives its name from the sugar-like substance that exudes to its surface upon exposure. It also contains considerable pitch and gum, which is the *is* referred to, inasmuch as their presence is somewhat detrimental, in that they cause shrinkage, and the pitch, unless held back by shellac or similar preparations, will force its way to the surface, through any number of coats of paint, and in special pieces containing an excessive quantity of the resinous matter, it is almost impossible to prevent blistering. This works bad when china glass finishes, or grained or polished work is instituted.

Fresh Water Seasoning

Is all that is required to make this product of the forests of California equal to any white pine produced in the United States. We have demonstrated this fact, and state it from personal experience. The more thorough and continuous, within reason, the water seasoning is to each separate piece, the more complete will be its effect in the removal of the superfluous, natural components of the wood. Raising and soaking in fresh water and transporting the rafts down rivers and streams to tide water, is about the best that can be done when the fresh water sources are available; but in California this auxiliary to seasoning is not possible. Our sugar pine grows inland, and is conveyed to market by teams or rail, or shipped on small vessels at certain points. Were it even possible to float it in the Sacramento or other fresh water rivers, there would be 30 miles of ocean salt water to cross, and the strong ebb and flow of the tide of San Francisco bay to encounter, before it could reach the market in this city. But even such rafting and floating, while it would improve the lumber to a considerable extent, would not wholly remedy the difficulty, for the reason that the large quantity of gum and sap in it can only be entirely removed by thorough soaking and friction. The bath process would nullify but not wholly dissipate the objectionable substance—still the benefit that any application of fresh water would be to sugar pine, would be worth all it would cost, where sugar pine is used for specially fine work or finishes. Reduced to its possible condition, the sugar pine of California would rank high among the white pines of the world.—*Cal. Architect.*

WESTERN COMSTOCK PROSPECTING.—Quite a number of prospectors have been scouting out along the western side of Mount Davidson during the past few days of pleasant weather, some making the lower portion of Washoe Valley their objective point of exploration. On this side of George Smith's ranch, parties have developed a fine ledge of gold and silver bearing ore, assaying from \$40 to \$60 per ton on the average. It is three or four feet wide, and shows very finely for a newly opened vein. A mile this side of there, other parties have found some good gold ore croppings. About half a mile to the west of Steamboat Springs, another party have commenced sinking a shaft under the potent direction of the divining rod, or indicator. They are very reticent, but say they know what they are about, and work with a lively will and good hope. If they do not strike brimstone and hot water soon, a drift east will fetch it sure.—*Virginia Enterprise.*

THAT NEW MINERAL.—All the newspaper talk about the discovery—about a year ago—of vast deposits of some unknown metal at Antelope will be remembered; how the State mineralogist finally decided that it contained nothing of value; how men were deceived by the product of iron in their crude attempts at analyzing, etc. Now transpires the practical part, which proves in the main that Professors Price and Soderling were correct when they said that the metal contained in the practically inexhaustible amount of gangue was sulphide of iron. Tests made in England show the stuff to be all important in the manufacture of fine steel blades, and a party willing to pay \$60,000 for the property is now getting out here after it. There are four owners besides Messrs. Benj. and Todkill, who may be congratulated even if their find did not prove to be tin or platinum.—*Bodie Press.*

STRAW GOODS are being manufactured on an extensive scale at a Mission street factory, where a large number of women and girls are at work making hats and bonnets. Pacific Coast dealers are relying on home manufacturers to a greater extent than ever before, and the prospects are bright for the building up of an exclusive trade, as there is a visible improvement in the quality of the goods made here, and they can be placed in the market at the same prices at which imported articles are offered. Some very fine work is being done at the factory referred to, especially that in which Milan straw is employed.

A Pioneer Ore Worker.

A *Tribune* reporter had the pleasure yesterday of meeting William Bruckner, the inventor of the revolving cylinder furnace bearing his name. He is here from Montana on mining business and will remain some time. His experience would fill a volume of interesting reading. Born in Germany, he was a student at Gottengen University and then graduated in the Freiberg Mining Academy. He first crossed this continent in 1864, when he passed through this city by the old overland stage. In 1866, just 20 years ago, he put in his first cylinder and took out the first metal brick at Black Hawk, Colorado. In 1869-70 he visited the Sweetwater, Wyoming mines, and reported there for Raymond's reports, published by the Government, and in 1870 he was given an escort from New Mexico to Mexico, to take testimony on some mines owned by American citizens. Discovering some rich silver-lead mines 100 miles south of El Paso, called San Domingue, he remained there till he sold out his one-third interest, and then going to Cincinnati engaged in manufacturing his cylinders. Wandering off to Germany, where he engaged in working copper, he remained abroad until 1879, when he came to Utah and put one of his furnaces in the old Flagstaff smelter. That is the only one in Utah, and it is now as good as ever, having been changed to West Jordan and placed in the works owned by the French company, now engaged in experimenting on a new reduction process. Within the past ten years Mr. Bruckner has traveled much, having visited various parts of America, Germany, Italy, Japan and Mexico. He is a member of the American Institute of Mining Engineers, which holds semi-annual meetings, the last one having been held in Pittsburgh in February. The next meeting, Mr. Bruckner informed the *Tribune* reporter, would be held in this city in August.

One object of the present visit of Mr. Bruckner here is for the purpose of putting in some furnaces for treating pyritous ores. He has lately taken out a patent for an improvement, combining the drying, desulphurizing and agglomerating processes all in one. This is done by having two revolving cylinders, one elevated enough above the other to permit ignition of sulphur while dropping from the upper to the lower cylinder.—*Salt Lake Tribune.*

THE Swansea marble quarry in Inyo county is opening up a large business. The quality of the marble is fully up to the highest standard yet drawn for it—that is, as good at least as the best known, no matter where found; there is no conceivable limit to the available quantity. The work now in hand, and likely to be for some weeks yet, is stripping to properly open the quarry before regularly beginning to extract merchantable blocks. Additional quarry men will be put on from day to day, or as fast as suitable men can be had, experienced marble quarry men being quite essential, for handling marble in place differs from any other rock and is a special trade in itself; for this reason suitable men are rather hard to find, though ordinary rock workers are plentiful. The C. & C. is now putting down a side track, which, in half a mile, reaches to the quarry. This will be largely used in getting rid of the vast amount of waste which cannot otherwise be easily disposed of, as the best marble lies below or near the surface of the valley adjacent. The company has not yet formally bound itself to furnish the 800 tons of marble for the Sharon gateway. The reason for this is, that in that quantity all to be of fixed sized blocks, all rather large, there are a number of perfect ashlers required, each of many tons weight. It seems there is not now a marble quarry opened in the world that could furnish such large and perfect blocks. While there does not appear to be a shadow of doubt about the ability of this quarry to turn out such, yet it is safer to wait until the quarry is properly opened before assuming the whole responsibility. Mr. Luce has already cut up good ashlers that were large enough—one that measured fifty tons. This marble quarry can but prove a very important industry for Inyo.

COMSTOCK UNDERGROUND FORESTS.—The *Virginia, Nev. Chronicle*, says: "No person unfamiliar with mining on a large scale can form an adequate idea of the amount of lumber daily consumed in timbering on the Comstock. The interior of the Con. Virginia hoisting works resembles a lumber yard in the morning before the timbers are sent below. At least 10,000 feet are piled around the shaft ready framed for lowering. The present daily consumption of lumber used in timbering in the various mines on the lode exceeds 100,000 feet, and requires the destruction annually of a small forest for that purpose to say nothing of the vast amount consumed for fuel in driving hoist and pumping engines. It is estimated that the trees required to furnish the lumber sent into the bowels of the earth to be used in timbering in the various mines on the Comstock lode would form an underground forest ten miles square."

MINERS on the Feather river in Butte county are talking about another tunnel through a mountain, by which to turn the river for mining purposes. This latter tunnel will be only 800 feet and will make 2300 feet of rich river bed to be in a minable condition.

FUNGI IN LUMBER.—A most important and interesting lecture was recently delivered before the New York Academy of Sciences in one of the halls of Columbia college, by Prof. P. H. Dudley. The subject, which was illustrated with the aid of the magic lantern, was "Fungi in Timber." The facts brought out as the result of long and thorough investigations made by Prof. Dudley, who has given this subject very great study, were exceedingly interesting and when given to the world must prove of great service in connection with the preservation and protection of timber and the relative merits of different woods for particular purposes, especially for railway use.

Prof. Dudley has been making investigations in this direction in connection with his work of examining the track of the New York Central, Boston & Albany and other railways with his dynamograph car and is entitled to the credit of having made several most important discoveries as to the qualities of various woods of this country, their liability to injury from different causes, the best means of protecting and preserving them, etc. So thorough have been his investigations and tests that there is probably no man in this country who would be better able than he to furnish the public such a book upon timber culture, protection, preservation, etc., as has long been needed. I do not know that he proposes undertaking such a task, but it is to be hoped he will do so. His address herewith referred to will be published in the forthcoming transactions of the Academy of Sciences, when I may have occasion to make more extended reference to it.

THE Ventura oil production is increasing. The *Democrat* says: "There has been no time since the oil wells were opened in this county that the petroleum interests looked so promising. The old wells are keeping up their lick, and newer developments are of a promising character. We are glad of this for a two-fold reason. The oil industry, as it increases, will add largely to the business and general prosperity of this community, and the pluck and energy of those who have stood to their guns through good and evil report deserve the heat of success. The steamers Santa Cruz and Al-x. Duncan have been supplied with iron tanks, in which they will carry oil hereafter in bulk, and as he most of this commodity on this lower coast is produced in this county, the increased facilities for shipping is a matter of local importance. The Santa Cruz on her last down trip discharged 85 tons of merchandise, and whilst unloading took on 25,000 gallons of oil, which is now conducted through a four-inch line pipe, from the tanks to the end of the wharf, thence to the steam-r's non-combustible receptacle. The Mission Transfer Co. expects to be able to supply the oil-carrying capacity of these boats every 10 days.

MOORE and Smith, of Stockton, have recently been shipping California lumber and shingles East by rail. The firm has before shipped shingles to Colorado and made the business profitable. Mr. Smith visited the principal cities of the East and sold large quantities of redwood and shingles. The firm has shipped over 90 cars of lumber to Eastern cities, including Boston and Albany, and to Chicago, Cincinnati, Detroit, St. Paul, Kansas City and other important points. A carload was recently shipped to Atchison. Mr. Smith says there is a great demand in the East for redwood which is found only in this State. It is used there for finishing and decorative work with fine effect, as Eastern mechanics have learned to polish it in the best style. One Eastern residence visited by Mr. Smith was finished inside with polished redwood and it was considered one of the most elegant houses in New York.

AGE OF FOREST TREES.—John T. Campbell reports some interesting observations upon the age of trees, which throw discredit upon the theory that wide, annual rings denote moist and fruitful years, and narrow rings indicate dry years. He finds that two neighboring trees, of the same description and the same age, will have rings of different characters in the same season. The healthiness of the tree, the amount of sun and moisture that it receives, the attacks of insects, the amount of suitable nourishment in the soil, etc., influence the amount of annual growth.—*Amer. Naturalist.*

THERE is a great and growing demand throughout the State for good lime and plaster. About 140,000 barrels are consumed annually in San Francisco, and the recent building boom will very materially increase the figure for the present year. Sonoma county is beginning to furnish some lime, as are also Marin and Napa. In the Santa Cruz mountains is found a very pure quality of limestone. It is of a crystallized formation and is easily burned. The outlook for the lime-making industry in all parts of the State was never better than at present.

A BIG LUMBER SUIT.—The Solicitor of the Treasury has instructed the United States District Attorney at San Francisco to bring suit against the Sierra Lumber Company to recover about \$221,800 damages for the conversion of timber and lumber taken from public lands. The special agents of the land office have been instructed to render the District Attorney all possible aid in prosecuting the suit.



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Passing Events.

The country east of the Rockies is in a state of excitement caused by labor strikes. Not only are the railroads affected, but lumber yards, furniture factories, flouring mills, coal mines, zinc works, agricultural implement factories, etc., are all in trouble. Lawless mobs in Chicago and Milwaukee have created riots in which several people have been killed, and the excitement still continues.

On this coast labor matters are quiet. The Governor has, at the request of the federated trades, made a legal holiday of Tuesday, May 11th, when there will be a procession or demonstration by the trades. But the whole matter is peaceable.

Mining matters develop nothing specially new outside of what we have noted in our Mining Summary. There continues to be a good demand for gold mines in this State, and just now there seems to be more intending purchasers than sellers, the buyers finding it difficult to get the class of properties they require—paying developed mines.

A POWDER JUDGMENT.—Judgment has been rendered by Judge Lawler in favor of plaintiff in the suit of the California Powder Works against the Blue Tent Consolidated Mining Company of California. The amount of the judgment was \$77,447.70 for material furnished, interest and costs. Some of the witnesses were summoned from Eogland.

Working Low-Grade Rock and Sulphurets.

In last week's PRESS we gave, in an article on "Mining and Milling in California," some facts concerning the Plumas-Eureka and Sierra Buttes mines, in this State, belonging to the Sierra Buttes Gold Mining Company of London. Since then we have received the report of the half-yearly meeting held in London, which develops some interesting facts, especially in the success of the chlorination works. In the Sierra Buttes the work for the past year showed an average value of ore of \$6.66 per ton, as against an average for the seven preceding half-years of \$6.91; the working cost was \$3.95 per ton, against \$4.33, the average of the seven preceding half years; and 25,250 tons crushed, against 20,628 tons. This shows that the cost of working has been reduced.

In the Plumas-Eureka the result of the half-year's work, though not so good as in previous times, is fairly satisfactory. The ore averaged \$7 per ton, as against \$7.32; the cost was \$4.89, against \$4.07, and tons stamped 28,194, against 28,347. It is noticeable in these figures that the small difference of 32 cents in the quality and 82 cents in the working made a difference of £6500. When a large quantity of ore is worked, a difference of \$1 or \$1.50 per ton very soon makes a difference of £6500, or nearly the amount of ore of the company's dividends.

In the case of the Plumas-Eureka mine the falling off in quality of the ore is that the flat vein which was a source of surprise and satisfaction at first has fallen off in quality, bringing down the general average. The additional cost was due partly to increased expense of working flat veins and partly to expense of a covered tramway which would admit of their working all winter. It cost \$15,000, but the mill was not idle in winter as would have been the case otherwise.

The chlorination works at the Sierra Buttes during the four months they have been at work have treated 136 tons, the average yield being \$188 per ton. This is from concentrates saved. This is nearly equal in fact, to the order of the whole ore of the famous St. John del Rey in Brazil—\$180. The working cost of chlorination at Sierra Buttes has been an average of \$24, thus giving a good profit on the sulphurets saved—\$164 per ton. During the six months they saved just the quantity treated during the four months, and they have a stock on hand that will let them go on for a time treating about 40 tons a month, but in the course of a few months they will naturally use up in that way the stock they have on hand and will then depend on their monthly savings.

They propose concentrating a little less closely than they have up to the present time so as to take in rather a larger quantity of pulp—some heavier grains of quartz—and they think they will, on the whole, get a larger amount of money, although the average yield per ton will be less. They do not expect hereafter to receive so large a return as during the first four months. That return has been over \$8000 a month (from the sulphurets) which has materially added to the monthly receipts.

The vein on the seventh level is of \$7 ore and shows no sign of diminution, and the discovery on the eighth level during the half year have been satisfactory, the prospects on the ninth being also good. The profits in the Sierra Buttes alone is about \$20,000 per month. These mines are making a good showing for low-grade gold ore in California.

Foundry Notes.

W. H. Birch & Co., of the California Machine Works, are building 750 sheaves and frames for the Hayes street cable road. They are also building four ten-foot sheaves and one eight-foot one for the terminal gearing. The switch gearing and other work is also being built by this firm.

There is very little mining machinery being made in this city at the present time. Business is very dull at the local foundries as has been the case for some time past.

The turn-tables for the Hayes Valley cable road are being made by the Phelps Manufacturing Co.

The San Francisco Tool Co. are at work on several pumping plants.

The lumber firm of A. M. Simpson & Bro. is now building at Coos Bay a steamer of about 70

feet in length to replace the steamer Novelty, recently sold by them to the Cutting Packing Company; also, another tug to assist in tows at Gray's Harbor. The engines will be made in this city. Captain Simpson also contemplates construction of a large ship for general freighting.

Sectional Names for California.

The propriety of subdividing California into several grand departments according to their geographical position, altitude, topography or other natural characteristics and giving to each such name as these peculiarities tend to suggest, or as may for other reasons seem appropriate, has somewhat occupied public attention and been from time to time discussed in the newspaper press. That a State covering such a vast area and so strongly marked in some of the particulars above mentioned might very properly be so subdivided and designated none will deny, the reasons for such course being numerous and obvious enough.

In considering this subject it has occurred to us that something like the following partitioning up of the State might be made to advantage; viz., let all that portion thereof lying north of Sonoma, Lake, Yolo, Sutter, Yuba and Nevada counties and west of the Sierra be called Northern California. Let the section extending from this department down to the northerly line of Monterey, San Benito and Fresno counties and lying west of the Sierra be designated Central California; all south of that line and west of the Sierra down to the northerly line of Kern county and following that line due east to the eastern boundary of the State to be called Southern California. For the country lying to the east of the Sierra Nevada mountains and south of El Dorado county we suggest the term *Trans-Sierra*, as being especially well fitted, many persons in writing about that region having already found it convenient to apply to it this name, which means over or beyond the Sierra. To justify the use of this prefix we have many precedents, as transcontinental, trans-val, trans-alpine, etc. Should many prefer it, the term *Eastern California* might be applied to this outlying portion of the State.

Some have already objected to naming any portion of the State Northern California, on the ground that the term is suggestive of a high latitude and a rigorous climate. There is, however, little weight in this objection. North Peru is hotter than South Peru, and the calling of one of the Carolinas *North* does not imply that it is materially colder than the other Carolina adjoining it on the south, much less that it possesses anything like an arctic climate. As well might be argued, that the term *Southern* applied to another part of California would be objectionable, as tending to convey the impression that the climate there is excessively hot as to suppose the term northern would prove misleading on this question of climate. We are of the opinion that the terms northern and southern, as already applied to these sections respectively, should be suffered to stand, being both appropriate and natural.

To the territory that covers the main Sierra north of Alpine county the term "Alta" or "Alpine" California, or some other word that conveys the idea of great altitude, might be applied. However subdivided, or whatever the names given to these subdivisions, the plan of partitioning up California in such manner as is here proposed, is a good one; and will, some day, be carried out. This State extends over very nearly ten degrees of latitude, and comprises within its boundaries vast areas of mountainous territory, great plains and valleys, with an immense extent of outlying desert lands—these several sections being both by location and natural features, broadly distinguished from each other. Out of these conditions there grows a necessity for recognizing this arrangement and assigning suitable names to these divisions which nature herself has already made, such as does not and never can exist in a country of limited extent and little diversified in its topography and climate. We have thus alluded to this matter not with the purpose of dictating exactly what should be done, but rather in the hope that having so broached the subject early and intelligent action will by our publicists and the newspaper press be taken upon it.

Elevator Wells and Fires.

The disastrous fire at the Bancroft building in this city last week, by which an immense amount of property was destroyed and several lives lost, has again called attention to the faulty construction of elevator shafts in high buildings. The fire referred to started in the basement, but by means of the several elevator wells leaped to the fifth story so rapidly that the employees barely had time to save their lives. The building was in a blaze both in basement and top story at once and in a few moments only after the starting of the fire. The wooden elevator shafts prevented the possibility of confining the fire to the basement.

The many suggestions made as to a means of providing iron trap doors in elevator wells at each story, which should open automatically to allow the elevator to pass and close after its passage, are not novel. Neither is it anything new to suggest brick shafts for elevator wells, which in case the fire entered, would simply lead the flame and smoke out the top without chance of setting fire to woodwork. But it would be new to do these things. The new Pioneer building has a brick shaft for its elevator, but scarcely another large building in the city has one. None, so far as we are informed, has horizontal iron doors to close behind the elevator.

The fault of the omissions cannot be charged against the architects, who recognize the danger of wooden walls, but against the owners who prefer the cheaper construction. The advantages of brick and iron are apparent and recognized, but the expense prevents their adoption.

It seems, however, if there is to be any improvement in this direction, it can be best brought about by the insurance companies. They now have a "compact" which lays down certain rules to which all companies agree. If the companies would all join in a firm determination to put prohibitive rates on wooden elevator shafts, and insist on a proper fire-proof construction of these important portions of a building, the evil would soon be done away with. They would be able, in fact, to enforce proper construction more effectually than any municipal resolutions. If owners found that their rates of premiums would be doubled or trebled on account of a cheap elevator shaft, they would soon see it to their advantage to build properly. It seems that none of the insurance companies held the Bancroft building in very high esteem, as it was a tall, wide shell, with no brick center or cross walls, and had four elevator wells. But still, insurance was effected upon it. If with each additional elevator well a good, stiff addition to the premium was called for on this and on other buildings, we should have much less danger to life and property from fire.

California Iron.

It is unpleasant to note that the smelting furnace of the California Iron and Steel Company at Hotaling, Placer county, has been closed down, and the men have been notified to vacate the dwelling houses. It is not believed that the works will be started up again for some years.

Iron mining and smelting has never been profitable on this coast. The Clipper Gap mine had no trouble in marketing its product, but when it came to compete in price with the imported article, there was no money in the enterprise. The disastrous fire a few years since was a bad set-back to the company, and the low price of iron since then has not given them an opportunity to reimburse themselves for the loss.

This was the only iron mine ever opened in California and worked to any extent. It was at first supposed that the enterprise would be a profitable one, and that the mines would prevent large importations. But such was not the case. English ships coming here for wheat cargoes could bring iron from abroad for exceedingly low freight, and they continue to do it. The Oregon iron mines have also been unprofitable, and one of them produced nothing last year. It seems strange that with all our mineral wealth on this coast, in the matter of coal and iron we are poorly off. And this is especially the case in California. The heavy expense of manufacturing iron here and the low price of the metal will prevent any further operations for some time to come.

Voltaic Batteries.

The wonderful progress made of late in new applications of electricity has created a demand for voltaic batteries that has taxed the energies of the manufacturers to supply. The telephone business of this country alone requires over one million cells, and the extension of telegraph systems, railroad signaling, district fire alarms, messenger service, bell-ringing, etc., has added another million within the past three years. It is estimated that over 5000-horse power of energy is being supplied by batteries in this country alone. The consumption of zinc is therefore very great, and as this is the only metal generally employed, the price has remained very firm and is likely to continue for some time to come. This fact should be carefully considered by the owners of zinc mines, as their value is likely to become much greater. We say this in view of the fact that the question of electric lighting from voltaic batteries has been solved, and several companies have been formed in the East and in Europe to develop and introduce different systems. The field that these companies propose to occupy is a very large one, and unless some other metal is found to replace the zinc that is now furnishing the fuel in nearly all voltaic cells, the consumption will be simply enormous.

A careful review of the patents that have been granted for voltaic batteries leads one to the conclusion that many inventors have been working upon the "cut and try" principle; and a study of their specifications shows such a diversity of language and want of scientific and technical knowledge, that the examiner becomes confused and reaches the conclusion that said inventors do not fully comprehend the subjects they are discussing. This is not to be wondered at, perhaps, for it is a lamentable fact that science has not yet fully settled what the chemical combinations and reactions are that take place even in those voltaic cells that have been longest in general use.

This is perhaps the reason why so little progress has been made in hydro electric batteries. That they are still open to great improvement is fully demonstrated by results lately obtained by the use of chromic acid in contact with the carbon electrode in a "zinc-carbon" cell. If this acid should be employed in the future to any great extent for battery purposes there will be found a good market for the chrome iron that is known to exist in quantity upon this coast, the price for which at this time little more than covers the cost of mining and is commercially controlled by a few individuals.

We are, however, as much in the dark as ever regarding the chemical reactions that take place in the so-called "chromic acid battery," and we urge upon our chemical educators and students the necessity of solving the many problems that are presented in the different kinds of batteries now in the market, and to join hands with the electricians in developing a battery that will be scientifically correct, cheap and effective. The cause of the variations in the electromotive force of batteries should be explained, and, if possible, overcome.

The cause of the internal resistance of batteries should be made known, for the economic problem of electric lighting from batteries depends upon reducing this internal resistance to a very small fraction of the total resistance of the circuit. A fortune awaits the inventor who can use a cheaper metal than zinc, even though a greater number of cells be employed to produce a given result. A careful study of what is known as "secondary batteries" may lead the inventor to devise a primary battery, the economy and efficiency of which may prove to be superior to any yet known or employed. The sulphates of the higher oxides of certain metals when used as electrolytes in contact with the metals from which the oxides are derived produce a battery that is generally employed for long, heavy and continuous work—as is fully illustrated in the different forms of what are known as gravity batteries, of which the Daniell cell is the first and standard type.

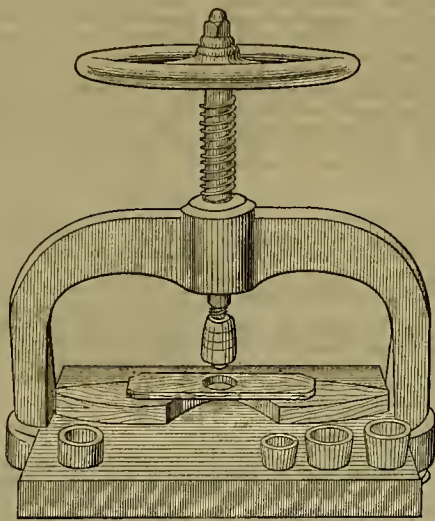
That copper and zinc are the only metals that have been generally employed in this class of cells seems to be a strange condition of things, and from what we have lately seen, by the combination of other metals with the sulphates of their higher oxides, and for which patents are now pending, we conclude that the days of zinc and copper are numbered and that iron and carbon will eventually take their

place. Aside from the sulphates of the metals employed for battery purposes, are the nitrates and chlorides, also largely employed for special purposes; and we believe that the best combinations for the transformation of chemical action into electricity is yet to be discovered. Perhaps in Nature's wonderful laboratory may yet be found the happy combination that will solve the problem, as petroleum has that of illuminating oils.

A Cupel Machine.

At the School of Mines, Rolla, Missouri, they have a machine for making cupels uniform in size and density, which has proved quite satisfactory after four years use. Professor Chas. E. Wait described the machine to the American Institute of Mining Engineers, and presented an engraving which we here reproduce.

As shown in the accompanying figure, it consists of a common letter-press, the movable platen of which has been removed. In place of the plate, there is attached to the screw a plunger, which turns with the screw, moving up and down, and making the depression in the cupel. The ring holding the bone-ash is held in place directly underneath the plunger by a wooden guide fastened to the base of the press. There is also fastened to the top of the guide for the ring, at a distance above the base of the press equal to the height of the cupel-ring, a



CUPEL MACHINE.

piece of wood about 3 inch thick, under which the ring will just slide into place, and through which there is cut a circular hole exactly fitting the plunger, guiding it in its downward movement always in the same vertical line; this last guide not only directs the plunger, but also prevents the lifting of the ring by the plunger, upon the raising of the latter.

There is also a small spring (not shown in the figure) which is arranged to push forward the ring after the ash has been compressed. As soon as the plunger is raised and the finger removed from the ring, it is pushed forward by this spring several inches, clearing both guides to a position on the front of the base of the press, from which it is taken to a simple contrivance for removing the cupel.

To make a cupel, fill the ring with slightly moistened ash, the plunger being raised just high enough to allow the ring to be put in place with the left hand, holding it with the left thumb. With the right hand give the wheel to which the screw is attached about one turn, depending upon the pressure required; reverse the wheel until the plunger is raised, and remove the thumb suddenly, at which moment the spring will push the ring to the front.

Cupels of any size may be made by having plunger, ring and guides to suit. I have been making three sizes: 1½ inch, weighing 18 grams; 1¼ inch, weighing 37 grams, and 1½ inch, increased depth, weighing 48 grams.

THE Arizona Citizen of April 30th says: The Quijota properties, known as the bonanza mines, were to-day attached by the Nevada Bank of San Francisco, for money loaned, amounting to less than \$30,000.

THE receipts of coal at this port in April were 54,000 tons, making total receipts since June 1st of 223,000 tons, against 306,000 during the same time last year.

Burning Pyritous Quartz.

In Victoria and New South Wales many of the miners believed in burning their sulphuretted ores before amalgamation and others thought it a detriment. The Government officials made a pretty exhaustive examination of the subject and obtained the opinions of many superintendents who had been experimenting. As a result of these investigations, the Mines Department reported that they considered it very disadvantageous to burn the pyritous quartz previous to crushing. A summary of their conclusions will interest California miners who have ores containing small percentages of sulphurets.

In the first place, supposing the ore only to contain true pyrites (species free from galena), the burning, however, carefully conducted, would not effect a thorough roasting of the pyrites, but produce, as it were—and as can be observed on examination of kiln-burnt mineral—three different stages. One part of it, in the center of the larger quartz fragments, is generally but little affected; another part is converted into a lower or mono-sulphide, which, in contact with clayey and silicious dust, produces hard, glassy slag coatings on the outside of the ore. The third part, that on the surface of fragments, freely exposed to the access of air during burning, is well roasted, i. e., converted into powdery sesqui-oxide of iron,

with its originally contained gold disseminated through it in microscopical particles.

Now, on subsequent crushing and amalgamation of the burnt mineral, the gold of the slightly affected pyrites cannot, or but very imperfectly be extracted by the common amalgamating appliances, whilst that distributed through the mono-sulphide of iron, the hard slag coatings and the iron sesqui-oxide is, to a great extent, lost; that of the first body through being too much enveloped, and the mono-sulphide itself being besides liable to sicken the mercury; that of the hard slag coating through being glazed over and is generally, with very great difficulty, liberated; and finally, that of the well-roasted mass, on account of its finely-divided state, which renders it liable to be carried off by the stream of water without ever coming in contact with the mercury.

Should the ore contain galena, or association with the pyrites, not only would the loss of gold be considerably increased, but quicksilver would be lost in notable quantities, the cause of this being the partial reduction or conversion of the galena, in contact with the burning fuel, into lead, a metal which, as is well known, sickens the mercury. If this amounted to less than one per cent, rendering concentration not profitable, the burning of the quartz previous to crushing would, like that of ore containing no pyrites at all, be advantageous, on account of the lower reduction of the burnt ore. It must, however, be remarked, that with any ferruginous quartz, there could also be a likelihood of the formation of the above-noted hard slag coatings over the surface of the fragments, with a consequent liability to loss of enveloped fine gold particles during crushing.

TWENTY young girls from the Scotch manufacturing towns arrived in East Oakland on Monday, to work in the cotton mill at that place.

An Old but Little Known District.

We publish elsewhere in this issue of the PRESS a letter from a valued correspondent, descriptive of the South Fork mining district, Shasta county. What is noticeable in this communication is the fact that this letter brings into view a mining locality of which the general public has heretofore had little knowledge. It is, indeed, highly probable that not more than a few of our readers ever before heard of this South Fork district, or even supposed that there existed such extensive deposits of the precious metals so far south in the Coast Range, a region generally regarded as exclusively a grazing country. And yet, this has been an active mining locality for more than thirty years. In the first place this was the site of placer operations, which, commencing early in the fifties, were continued for fifteen or twenty years, hydraulic washing being still carried on in this district. In the winter season when water is plenty some ground sluicing and gulch washing are also practiced.

Some ten or twelve years ago vein mining was here engaged in, a dozen or more arastras having since been kept steadily running on the free gold ores found in the small ferruginous quartz veins, of which there are many in the district. But little headway appears, however, to have been made in this department of mining, owing to the refractory character of the great mass of the ores, which are largely silver-bearing. As these ores are of good grade this district ought to present an inviting field for parties having the means to successfully handle them, in which light it is worthy the attention of the "process man." Here would also be a good place for experimenting with concentrators, roasting furnaces and the like, particularly those supposed to possess any special fitness for treating base ores. Wood and water are represented to be plentiful in the district, which can be easily and cheaply reached from San Francisco. Few mining localities seem, in fact, to be better situated as regards natural advantages and accessibility than this. The location of this South Fork region, so far south in the Coast range and close on the borders of the "cow counties," tends to show how the mineral, the grazing and the grain-growing districts of California run into and almost intermix with each other, the fruit-raising territory covering them all.

Contra Costa Coal.

The only coal mines in this State that have been at all productive are those known as the Mount Diablo, in Contra Costa county. The coal of late years has not been so much used for domestic purposes as formerly, better qualities coming from abroad and from the Puget Sound region. Moreover, the Mount Diablo mines have been gradually reducing their product, and within a year or two some of them were shut down, and the little mining towns and settlements thereabouts have in consequence lost much of their population. As a steam coal that from Mount Diablo has always been popular and is largely used. The mines were well equipped and properly opened, but from various causes some of them did not pay. Now, however, it looks as if there would be a new lease of life for the coal mining region of Mount Diablo. In 1884 James Rankin and George Hawxhurst leased the Pittsburgh coal mine for a term of five years, and began running it under the name of the Somerville Coal Mining Company. The great depth of the mine made it very expensive to work, and as the cost of the mining was about equal to what the coal could be sold for, they soon realized that something must be done to reduce expenses. Consequently, they ran a tunnel some 700 feet in length, at a cost of about \$2500, and on Friday of last week a vein of coal about three feet in width was cut, and they are now taking out 50 tons of coal per day, with the prospect of an increase to 100 tons. A ready market is found for all that is taken out, and the discovery has brought new life to that section of the county. Men are flocking that way, with the hope of steady employment, and instead of the mines having to be shut down, the houses sold for just what they would bring and the town abandoned, as was the case at Nortonville, there is every prospect of Somerville increasing in population and assuming an air of prosperity.

MECHANICAL PROGRESS.

Collapse of Boiler Flues.

In view of the importance of the object, we cannot do better than point out the respective causes of danger.

First, with regard simply to the danger of collapse in the flues of large diameter; it is well known to engineers that the resistance of wrought iron to the compressive strain to which a flue is subjected, is much less than its power of resistance to the tensional strain to which the shell is subjected. Here is the first inherent weakness in flues with material of the same thickness as in the shells. Diameter is a great factor in either weakness or strength; that is to say, the larger the flue the greater is its tendency to collapse, and on the average the diameter of flues in marine boilers is on the increase.

Similarly, the greater the length of the flue unsupported, the greater its liability to collapse; this can be avoided by the introduction of flanges or supporting rings at different points in the length of the flue. Theoretically, a flue is, when perfectly cylindrical, in its best form to resist collapsing pressure, as the pressure is all then resolved as compression upon the material. Should, however, any deformation in the shape of the flue occur from this perfect cylinder, the tendency to collapse is very much increased in the direction of the flattened sides.

Now, in all cases where flues do eventually collapse, it is probable that they show a previous deformation in the direction in which they are about to collapse, and the proper notice of this change of form would frequently suffice to warn the engineer in charge, who might, by staying, prevent ultimate collapse; or, at any rate, reduce the working pressures until the danger was removed. The examination of flues, as to their maintenance of form, should be regularly conducted from time to time by means of a suitable gage-bar, which could be easily inserted at the end of a rod and tried in different directions to ascertain whether any deformation was setting in. This, in practice, is seldom done, as engineers in charge of boilers are apt to overlook the immense increase of danger of collapse after a very slight deformation has commenced.

In raising the question as to whether collapse may not be due, in the first place, to heavy incrustations on the heated surface, we would say that such incrustation, tending to allow the temperature of the plates to be raised, very materially reduces their strength, and thus hastens change of form and ultimate collapse. It is quite possible that an engineer, in his anxiety to avoid corrosion, knowingly permits incrustation to a certain amount to accumulate upon the inside faces of his boiler plates, and there is no doubt that a thin layer of such incrustation is a great protection against corrosion, but it is easy to overdo this with lamentable consequences to the strength of the flue plates.—*Boston Journal of Commerce.*

Science in the Workshop.

The *Trade Review* says: "When mechanics as a general body become more thoroughly impressed with the conviction that the way to advancement, both as to personal position and monetary returns, lies through the mastery of science, in the application of principles to their daily work, we may anticipate some joint movement on their own part to establish means for acquiring technical knowledge. We might multiply examples of the benefit of courses of scientific training. The proper understanding of the laws of expansion and contraction, as applied to many castings, and even to the wrought-iron and steel industries, would prevent much waste in the foundry and at the forge, from the effect of unequal expansion and contraction, and also occasion fewer inequalities in the quality of that supposed treacherous material, steel. It would also prevent many mishaps to boilers, engines and their accessories in cold weather. A knowledge among workmen of the principles of inertia, as affecting bodies in motion, would frequently prevent a breakdown in starting or stopping machinery suddenly. For all connected with blast furnaces, the value of chemical knowledge is apparent, as enabling them to trace the cause of faulty results. There is scarcely a workshop of any importance, in which an acquaintance with geometry will not be of value. In short, the value of science asserts itself every hour in the workshop. The scientific mechanic never falls into ruts, either of thought or habit. Working more intelligently than others, he finds more pleasure in his labor. His suggestive faculties are ever at work, and he is ever alive to the possibility of mechanical improvements, from which he may reap a handsome reward. The manufacturers who have risen from the hench without acquaintance with technical science constantly feel themselves at a disadvantage.

EFFECTS PRODUCED BY HIGH PRESSURE.—EXPERIMENTS REPEATED.—M. Friedel, having questioned the announcement of M. Spring that a pressure of 5000 atmospheres exerted upon amorphous pulverulent matters causes them to become aggregated into crystalline masses, MM. E. Jannettaz, Neel and Clermont

determined to repeat his experiments, using pressures of from 6000 to 8000 atmospheres. They operated upon pulverized antimony, bismuth, zinc, iron, tin, copper and lead, Darcey's alloy and brass, lead, and zinc sulphides, iodine lead and mercurous chlorides, mercuric iodide, magnesia, alumina, silica, chalk, and copper sulphate. All these powders were agglutinated into solid masses, but even those which acquired some degree of transparency were not crystallized. Many of the substances, however, such as stearite, graphite, clays, and metals, acquired a schistous structure, and assumed the thermic properties characteristic of such structure.

INVENTIONS WANTED.—There will be no end to the number of inventions wanted until all the labor now performed by human hands is done by machinery. When all people can sit down and eat the bread of idleness—having nothing to do but watch machines performing all kinds of labor—then will come the day when cheap Chinese labor will no longer bother and vex the souls of the Knights of Labor. A recent number of *Mechanics* enumerates the following things for which there are loud calls: Macaroni-machinery, separators for mica and graphite, good red lead-pencils, comb-graining machinery, portable power transmitting dynamometer (preferably for helms), type-writers which will work on account books and record books, indelible stamp-cancelling ink, a practical car starter, a good railway car ventilator, better horse-shoes, radial car-axes, independent car-wheels, locomotive head-light, anemometer or instrument for measuring velocity of wind currents, apparatus for measuring the depth of the sea without sounding, by line, piano lid hinge which shall be "flush" on the outside, good fluid India ink for draughtsmen, reciprocation counter for locomotives, solder for aluminum, another good method of working iridium, substitute for coal-tar pitch in making artificial fuel from anthracite coal-dust and culm, good metallic railway tie, good independent cut-off for locomotives, flexible book back, method of alloying copper and iron, better facing compositions for iron-founding, good moulding material for iron and brass casting, capable of giving mould which can be used over and over again.

IMPROVED MODE OF DECORATING METAL SURFACES.—Mr. Piper, of Wolverhampton, England, has lately devised the following method of etching metallic surfaces, by which it appears possible to produce highly decorative effects.

According to Mr. Piper's method, the article to be treated is electro-plated with gold, silver, nickel, or other metal, and on this the design which it is desired to produce is traced with some suitable acid-resisting substance. The article is then immersed in an acid bath, by the action of which those portions of the surface which are left unprotected are deprived of their electro-plated coating, and the naked metal beneath is given a frosted or dead appearance. The article is then well rinsed to remove all traces of the acid employed and the acid-resisting varnish is removed by the use of alcohol, oil or other proper solvent. The result is a frosted or dead-luster surface of the original metal, upon which the design in the electro-plated metal stands up in relief. If, for example, the article be one of copper and the plating silver, the design will be in silver upon a dead copper ground. It is manifest that the operation may be reversed—that is, the design to be reproduced, instead of being protected, as in the foregoing procedure, may be left unprotected, and the remainder of the electro-plated surface covered. In this case, after going through the above described operations, the design would appear to be in dead copper on a silver ground.

EMPLOY ONLY THE BEST MACHINERY AND TOOLS.—In the present season of general depression it behooves machinists and manufacturers to exercise the utmost economy in every department of work, and especially in the character of the tools and machines with which they work. Every individual, indeed, should equip himself in the most efficient manner for the inevitable struggle for existence. How many firms are to-day using tools which should long since have been broken up and consigned to the furnace as old iron. Old firms are frequently seen holding on to antiquated tools through false ideas of economy, while younger firms are springing up all around and doing well because the older ones are heavily handicapped by their antiquated notions and practice. Take for example such a simple instance as a lathe, which is generally regarded by many as being pretty much the same thing all the world over; yet so great is the difference that, with the most modern tool, the same man would be producing 20 feet of 2½-inch shafting per hour, whilst with old ones, to which they still cling so tenaciously, he was scarcely able to produce 20 inches per hour. It is not sufficient now that a lathe should do a certain work, but it is also important that it should do that work in the least possible time. Many other instances might be noticed, but enough has already been said to suggest a few important thoughts to thinking men.

HOW TO USE FILES.—When you are doing a difficult filing job use two or three files. They seem to take hold better and work freer from having a "resting spell job." Perhaps it is because different files fit the hand differently, and thus furnish rest and a change.

SCIENTIFIC PROGRESS.

The Conservation of Energy.

We had occasion, a few days since, to step into the California Electrical Construction Works, on Stevenson street, in this city, of which Prof. N. S. Keith is electrical engineer. While examining the peculiar mechanism and construction of his dynamos, we were particularly interested in noticing the various forms of energy exhibited in those shops, and the ready and visible manner in which they were converted from one form to another. There was a line of shafting driven by an unseen steam engine. A belt from the shaft was driving a dynamo, which, in turn, exhausted its energy in producing several electric lights.

Here, in the first instance, was the stored-up energy of coal liberated in the form of heat, which was conveyed to the engine by means of steam.

In the second place, mechanical energy was seen developed by that heat and through the mechanism of the engine putting in motion shafts and pulleys which were connected with a dynamo, by which the mechanical energy developed was converted into electricity.

In the third place, we saw the electric current conveyed by a wire to a series of lamps and there disappearing, or rather being transformed, into light and heat.

The fourth step in the progress of this transformation of energy was the brilliant electric light, scattering its energy abroad, and piercing the surrounding darkness with its penetrating rays.

In this cycle of operations—this conservation and transformation of energy—not a single form came anywhere into existence without the disappearance of some other form. Heat was seen disappearing and mechanical energy appearing in its stead; next mechanical energy disappeared and re-appeared in the form of electricity, which, in its turn, disappeared only to re-appear the next instant as light and heat.

The conservation of energy was continuous and perfect. Nothing was lost—nothing gained. If instruments had been applied capable of measuring the amount of energy developed by the coal and followed throughout all its changes until its final disappearance in the heat and light of the electric lamps, making due allowance for friction, resistance and leakage in its passage, not a particle of energy would be found to have been lost. The great law of conservation of energy is perfect in its operation, and it is seldom that so rare an opportunity is offered for witnessing and studying this great economic law of nature as by a visit to the scientific workshop of Prof. Keith.

Echoes at Sea.

A new method of determining the near presence of icebergs on high shore lands and even ships in a fog, has been devised by Mr. Frank Della Torre, of Baltimore. This device is based upon echoes and has been thoroughly tested at Fort Carroll, by order of the Navy Department. This apparatus consists of a single harrel breech-loading rifle, provided with a large funnel or speaking trumpet on the muzzle, a box of cartridges, and a tripod. The first experiment was made from a tug, at a distance of half a mile from the fort. With the discharge of the rifle, a distant echo was heard by those on board the tug, without the use of any receiving apparatus other than the unassisted ear.

When a boat intervened between the tug and the fort, two echoes were heard, the fainter one coming from the vessel. In favorable weather, the echo has been heard four miles. The steam whistle of the tug was also tried, but gave less distinct echoes than the sharp report of a rifle. A passing steamer, about a mile from the tug, gave a very distinct echo. Mr. Della Torre's signal was intended primarily to prevent collisions with icebergs in heavy weather, when it was impossible to be aware of their presence except by means of an echo, but is equally applicable in advising a ship's officer of the neighborhood of another vessel or other obstruction to navigation.

Mr. Bell, it will be remembered, has interested himself in this method of signaling, and believes strongly in its practicality. The navy officers who made the experiments at Fort Carroll will report favorably on the invention, and advise further experimentation. It is suggested that an officer be detailed to try this method of collecting sound on board a United States man-of-war, so as to test the effect of different states of the weather, and ascertain precisely the range of usefulness possessed by the invention.

PHOTOGRAPHY BY A LIGHTNING FLASH.—From a communication by Professor E. J. Houston to the Franklin Institute, it would appear that Mr. Albert S. Barker, of Philadelphia, has succeeded in taking two very fair photographic negatives of outside objects while illuminated by no other light than that of a single lightning flash. These photographic views were taken at 7 p. m., while the night was excessively dark, the wind strong, and the rain heavy. The camera was placed in an open window, with the slide drawn. The lightning flash came in less than a minute, when the slide was returned. The plateholder was then reversed, and suitably placed for a second exposure. The plate was one of the highly sensitive

gelatine films. Mr. Barker developed the plates the same evening. From their behavior he estimated the actinic effect of the light to be equal to that obtained from an exposure of about 1-300 part of a second in bright sunlight. The popular impression as to the duration of the lightning flash is that it is practically instantaneous. From the experiments of Wheatstone and others with the rotating disc, the duration of the flashes measured would appear to vary from 0.001 to 0.0001 second. Others estimate the duration of the flash as even shorter than this. It is a significant fact that, in his photographs of Mr. Barker, the foliage shows unmistakable evidence of having perceptibly moved during the period of exposure, thus demonstrating that the flash was by no means instantaneous.

A Solar Cyclone.

Those who have looked through a large telescope under favorable atmospheric conditions, at one of those immense cyclones which occasionally break out on the surface of the sun, have derived from what they saw a very good idea of the origin of sunlight. They have seen that the brightest portion of the surface of the sun consists of columns of intensely hot metallic vapors, averaging about three hundred miles in diameter, rising from its interior and glowing with extreme brilliancy, from the presence of clouds formed, probably, of shining particles of carbon precipitated from its vapor as the tops of the columns reach the surface and lose heat by expansion and radiation. (A good idea of such a precipitation is had by observing the particles of water condensed from transparent vapor, in unusually high thunder-heads, where the action is in some respects similar). Between these ascending columns are seen descending masses of cooler vapors, rendered dark and smoky by relatively cool and opaque particles of carbon, all, or most, of the other elements being still maintained by the excessively high temperature in the condition of transparent vapor. In the immediate region, however, where the cyclones are raging, these bright ascending columns are drawn out horizontally by the rushing metallic winds (which often reach a velocity of a thousand miles per hour) into long filaments, pointing in general toward the center of the disturbances, which is always occupied by a huge black cloud of smoke (frequently twenty thousand miles in diameter) rapidly settling back into the interior of the sun. Over and across this great central black cloud are often driven long arms of the shining carbon clouds, which, when the cyclonic action is very strong, bend round into slowly changing spiral forms, very suggestive of intense action. A striking illusion, invariably connected with this sight, is that the observer seems to be viewing it from a position quite near the scene of the disturbance, whose minute and complicated details are seen with exquisite distinctness.—*Manufacturer and Builder.*

FORCE EXERTED BY GREAT STORMS.—Take the velocity of the wind at 60 miles per hour, or 5280 feet per minute, which is that of a violent storm, this pressure it exerts is one-eighth of a pound per square inch. Let us suppose further, that the breadth of the storm is 250 miles, and that the height of the storm wave is one mile. A square mile contains 4,014,489,600 square inches, so that for each mile in width of the storm there is a superficial area of 4,014,489,600 square inches, on which the storm acts with a pressure of one-eighth of a pound, and at a speed of 5230 feet per minute. From these data the equivalent horse power of a storm may be readily estimated, this result being 80,259,792-horse power for each mile of breadth over which the storm extends.

RESTORATION OF MAGNETISM BY HEAT.—A correspondent of the *Scientific American* says: "To heat a magnet to a red heat has long been known to destroy its magnetism; but from a recent experiment of mine with two sound magnets that have from want of care lost nearly all their magnetism, I fully restored them by rubbing a red hot iron, ¼-inch, over them until it had become quite cool. The magnets are now better than when new. This experiment was prompted in my desire to prove magnetism hears to heat as close a relation as electricity. Thus we hope soon to be able to make a clearer demonstration."

VITAL POWER OF MUSCLES AFTER DEATH.—Brown-Sequard, the French physiologist, has demonstrated that for several weeks after death, or during the persistence of the rigid condition which immediately follows the cessation of life, the muscles of an animal undergo slow, alternate contractions and elongations; and he reaches the startling conclusion that the muscles in *rigor mortis* are not dead, but are still endowed with vital powers, being, however, in a certain chemical condition which is antecedent and preparatory to final death.

THE AIR OF THE SEA.—The air of the sea, taken at a great distance from land, or even on the shore and in ports when the wind blows from the open, is in an almost perfect state of purity. Near continents the land winds drive before them an atmosphere always impure, but at 100 kilometers from the coasts this impurity has disappeared. The sea rapidly purifies the pestilential atmosphere of continents; hence, every expanse of water of a certain breadth becomes an absolute obstacle to the propagation of epidemics.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

AUTOMATIC RAILWAY SWITCH AND SIGNAL.—Edward Y. Kuapp, Arcata, Humboldt Co., assignor of one-half to George W. B. Yocum, of same place. No. 339,305. Dated April 6, 1886. This railway switch or signal is designed to be operated by an approaching train. It consists in an oscillating transverse shaft in the road-bed, a peculiar trip engaged by an arm on the locomotive, connections between said trip and the shaft, by which the latter is partly rotated, a weight connected with the shaft, and by which it is returned, a rotating lever connected by a pawl-and-ratchet mechanism with the shaft and operated thereby, balanced connections between said lever and the throw rails of the track, and the semaphore signal, and a pendant in the road-bed operated by the movement of the semaphore stem, and adapted to receive the contact of an arm on the locomotive whereby a bell is struck.

FRUIT-DRIER.—Andrew J. Hatch, S. F. No. 339,767. Dated April 13, 1886. This is more especially applicable to that class of fruit driers in which a long, horizontal chamber is employed having doors or openings at intervals on the sides, through which cars or trays are introduced to be dried, and removed when completed. It consists of a suspended, swinging or portable chamber, or casing, having its inner end fitted to rest against the side of the main chamber, so as to inclose one of the doors of said chamber, and having a door at its outer end which may be opened to admit a car and be closed behind it before the doors of the main chamber are opened; a means for making a tight joint between the edges of this removable chamber and the sides of the main chamber, and a means of transporting it along, by the side of the main chamber, so that it may be applied to any of the doors of said chamber.

HORSE HAY RAKE AND CARRIER.—Byron Jackson, S. F. No. 340,122. Dated April 20, 1886. This is an apparatus for gathering hay or grain and carrying it to a ricking or stacking apparatus or other point of deposit. It consists of a frame-work mounted on wheels, having long teeth or fingers projecting toward the front, a pushing and riding extension to the rear of said frame, with supporting-wheel hinged to said rigid extension, so that the rider may depress the points of the teeth by standing on the hinged wheel lever, until a load is gathered, when, by sitting on the stiff lever, his weight will raise the points and balance the load, and carry it on the wheels. It also consists in means for attaching horses to the frame or the extension independent of each other, so that they can steer the rake without a rudder or tiller wheel, and a swinging rack or frame suspended above the rear of the rake-teeth or fingers, having ropes connected with them and with the backing strap of the harness, so that the load may be discharged from the rake and in a compact mass. It further consists in tops or shoes by which the teeth or fingers of the rake are prevented from splitting or breaking, and in a means for holding hay or straw in place when being discharged from the rake.

LOGAN, Pahranagat District, Lincoln county, Nev., where some twenty years ago there were some 400 prospectors, is now populated by a singular character named Bythe, who ekes out a miserable existence by coyotting the rich ore from the ledge croppings of the district. This hermit owns, says a correspondent of the *Pioche Record*, some mines that in an accessible locality would make him a millionaire.

HARTSFELD FURNACE.—The *Tombstone Epitaph* of the 23d says: "The custom smelter started up yesterday under charge of Mr. Hartsfeld, the patentee. It made a successful run, showing that it is capable of doing good work."

THE Dayton, Nevada, News Reporter says: If present prospects hold good, and all expectations are realized, Dayton will presently come to the front as a bonanza town, the bonanza being the bed of the Carson river.

A RAILROAD from Fenner, on the Atlantic and Pacific, to the Pimelena mines, is to be built, and a smelter, to cost \$200,000, will be built at The Needles to work the ore from these mines.

THE Grand Central pumps are about completed and will in all probability commence operations in a few days. This will be good news to the Tombstone public.

THE last cleanup of the Young America mine, Sierra City, was \$29,000. The company employs about seventy men and has a twenty-stamp mill.

THE Auburn mine and mill near Dun Glen, Humboldt county, Nevada, has been sold for taxes, amounting to \$1054. The property cost the Chicago company owning it \$200,000.

THE 10-stamp mill belonging to Andrew Bros., on Hill's Flat, below the Idaho mine, Nevada county, was destroyed by fire last week.

USEFUL INFORMATION.

OVERWORKING BOILERS.—Doubtless much of the mystery of boiler explosions could be traced to the above-mentioned practice of over-weighting, a practice criminal in its nature, inexcusable on any grounds whatever. If the manufacturer needs more steam, let him get more boilers in which he can safely make the desired quantity of steam. To additionally load the safety valve is to test every part of the boiler beyond the safety point, and if an explosion does not result it is not the fault of the criminally careless engineer, or his principal the manufacturer. It is the height of foolhardiness to risk the lives of those engaged in the works or in the vicinity of the boiler, and to risk the liability of destruction of the buildings adjacent, simply that a few dollars may be saved or that a little more steam could be supplied than the safety limit in the boiler would permit. Some have the foolish idea that because a boiler has done good service for a number of years, it can be relied upon to perform duty beyond that prescribed by the rules of safety. They reason that because it never has exploded therefore it never will. But frequent explosions reported within the past few years should demonstrate that this view is erroneous. A due regard for the rights of others should deter a manufacturer from overworking his boiler, for, should an explosion occur, the lives and property of individuals residing in the vicinity will be imperilled. If the boiler is insured, then certainly such treatment of it as we have mentioned is a fraud upon the insurance company. But even were there no outside considerations, self-interest alone should teach the owners the impolicy of working their boilers beyond a safe pressure.—*Industrial World.*

LEATHERBOARD.—The manufacture of "leatherboard" as a substitute for real leather for shoe stiffening is an important industry in Maine. The peculiar thing about leatherboard is that to a certain extent the name is a misnomer. While the product has the color and quite the appearance of leather, yet the best qualities have no leather in their composition, but are composed, instead, of hemp, flax and similar materials, ground up and pressed into sheets by a somewhat similar process to that of the manufacture of paper. The manufacture affords a convenient opportunity for the disposal of old sails, cordage and other worn out materials into which the required ingredients have entered, and, as in the manufacture of paper, the product bears little apparent relation to any of its constituent parts.

BANK LOCKS.—As an illustration of the progress which has been made in the last few years in a single direction in the matter of material protection for the valuables of banks, it is interesting and important to note that the combination lock, which in its earlier stages was comparatively easily made a victim to Mr. Yale's wonderful micrometer, has now been so improved and perfected as to absolutely defy the searches of this little detector. Every bank cashier should remember one remarkable fact regarding the modern combination lock. If not properly looked after, regularly and thoroughly examined and cleaned, it will be liable to change its combinations. Instances where these locks have themselves changed their combinations have come under notice.

DISTEMPERING.—Whiting, and jellied size made into a paste, and then melted to a clear liquid, will, as most of our readers know, turn, to dry yellow, unless a little blue or black pigment be added, the mixture being afterwards strained. In applying the wash care should be taken to stop all draughts. The painter should face, as far as possible, the light so that his hand and arm should not shadow the end of each stroke. Care must be taken to have no patches requiring to be gone over. If the work is executed in a uniform dark tint inclining to blue, it will then dry white. The moment the job is finished the outside air should be freely admitted.

TO PREVENT DAMP WALLS.—A recent German invention, composed of pulverized iron and linseed varnish, is intended for covering damp walls, outer walls, and, in short, any place or vessel exposed to the action of the open air and to the weather. Should the articles to be painted be exposed to frequent changes of temperature, linseed oil varnish and amber varnish are mixed with the paint intended for the first two coats, without the addition of any artificial drying medium. The first coat is applied rather thin, the second one a little thicker and the last in rather a fluid state.

WATER-TIGHT BRICK.—A brick being porous as a lump of sugar, and having six sides, needs careful filling for water-tight work in cesspools, etc., and a thin grout of porridge of cement is commonly used. Heating the brick and soaking beforehand in thick coal tar has been recommended. A man may lay common wall all his life without learning how to make brick water-tight.

PAINT FOR WIRE CLOTH.—The *Scientific American* gives the following formula for mixing paint suitable for painting wire cloth green, one that will dry quick and hard and not easily crack off, and be glossy as if varnished. A

mixture of three-fourths zinc white with one-fourth white lead, to which a little drier has been added, will be found to answer quite well. Coloring matter to suit is ground in with the above. To mix and apply oil to prevent wire cloth from rusting by long standing, use raw linseed oil.

ZINC.—L. L'Hôte, in *Comptes Rendus*, says: As to the inquiry if zinc free from any foreign metals decomposes water either on boiling or in presence of dilute sulphuric acid, experiment proves that such is not the case. Pure zinc heated with distilled water in a flask, so arranged as to receive the gases over mercury, gives off no hydrogen on prolonged boiling, nor is it attacked by dilute sulphuric acid. The presence of iron in proportions of from 3 to 5 in 100,000 enables it to decompose water. Traces of arsenic and antimony have the same effect.

TEST FOR GLUE.—The following simple and easy test for glue is given: A weighed piece of glue (say one third of an ounce) is suspended in water for 24 hours, the temperature of which is not above 50° Fahr. The coloring material sinks and the glue swells from the absorption of the water. The glue is then taken out and weighed; the greater the increase in weight the better the glue. If it then be dried perfectly and weighed again, the weight of the coloring matter can be calculated from the difference between this and the original weight.—*Manufacturer and Builder.*

NEW GALVANIZING PROCESS.—A New England firm has introduced a new process for galvanizing wire. It is claimed that by this new method a thorough union of the coating with the body of the wire is secured, and that in every case a smooth, firm surface results. Great softness, tensile strength and uniformity of temper are also said to be obtained in the wire, while the coating itself remains intact after the wire has been tested by severe twisting.

TO KEEP CISTERN WATER SOFT.—Paraffine rubbed on the dry walls and bottom of a cistern and melted into the cement with a hot iron is the most effectual method of keeping the water soft or free from lime. Cisterns, when plastered with pure Portland cement, generally give satisfaction.

FOR A cheap preparation to dip wrought iron articles in to prevent rusting (after being milled), use hot soda water to clean from oil, then hot lime water, and dry.

GOOD HEALTH.

How to Live Long.

The *London Standard* says on this point: "Men or women who intend to be centenarians in these days must combine something of the old mode of life with something of the new mode of living. They must, while availing themselves of all the scientific discoveries and sanitary appliances of the age, imitate their grandfathers in the steady and tranquil habits that prevailed before the invention of locomotives and the telegraph. They must have their eight hours of sleep regularly; they must have intervals of repose and vacuity in the daytime; they must spend a goodly portion of their waking hours in the open air. Nor will that suffice; there will have to be regularity in the hours of their meals and discipline in the ordering of the dishes of which the meals are composed. We cannot believe that anybody will ever live to 100 who eats a heavy dinner every night of his life at eight o'clock. Champagne in abundance and Bordeaux and Burgundy are to be forsworn by persons who deliberately set before them the attainment of their hundredth birthday. Neither, with such an end in view, would the active life of a politician, a lawyer or a doctor be a sane enterprise. In order to reach that distant goal there must be a training, if not severe, at least regular and unflinching. Most of all, there must prevail in the existence of such a person, a tranquil serenity, an unruffled calm. Neither generous passions nor enthusiastic ideals must be allowed admittance. The pulse must never be driven up beyond a certain point, either by work, by anxiety, by fear or by hope. At the same time, mere stagnation will, in all probability, never enable a person to live to 100. There is such a thing as rusting out as well as wearing out. If a candle does not burn brightly enough it does not consume the wax with sufficient rapidity, and goes out for want of adequate combustion.

FOR DIPHTHERIA.—Dr. Wachsmuth, a noted physician of Berlin, recommends that the patient should first take as much warm tea or thinned milk as he can drink. The legs are then put for a long time in hot water, and afterward rubbed vigorously with the hand. The treatment is varied according to the stage of the disease by hot and cold rubbings and warm drinks. The patient is finally wrapped in woollens, and will recover if he can be made to sweat. Diphtheria is easily conveyed, and often by the most unexpected means. The Board of Health of Amsterdam, N. Y., have recently investigated an outbreak of diphtheria, from which two children died; a third, who was attacked, recovering. The disease was traced to a pet

kitten, with which a little girl played while the animal was sick with a swollen throat and discharge from the nose. The cat died. The child was taken sick and also died. Another girl had played with a doll which had belonged to the deceased child; she was also taken sick and died. Still another contracted the disease without other means of communication than the doll. The latter was supposed to have been disinfected.

A Sanitary View of Burial.

In a recent sermon the Rev. Dr. R. Heber Newton, of Mass., speaking of cremation, said: "Another custom which is wrongly conceived to be a duty toward the dead is that of interment as we now practice it. Our custom of disposing of the remains of the dead may be proper and necessary. It is not for me to dogmatize upon such a matter. To me personally the custom is unspeakably revolting. The earlier usages of interment facilitated the inevitable dissolution of the physical body, and made that process as speedy and inoffensive as possible. The old Greeks, when they buried at all, placed their dead truly in the bosom of earth-mother. They laid them away in the ground, draped in their flowing robes, flowers sprinkled above their breasts, nothing around them to interfere with the chemical process which nature immediately sets at work when death ensues, in order to return earth to earth, ashes to ashes, dust to dust. We have preserved the outward form of interment, and have then added every possible hindrance to the natural process of dissolution. We place our dead in two or three cases. We inclose the wooden casket in a metallic box and seal it as tight as possible. We cannot prevent the inevitable, but we can do what would be an innocuous process into one fraught with danger for the living. We would make the dead beneath the earth a standing menace to the living above the earth.

"So long as the population of a region is comparatively light, this danger may be insensible. As a district fills with the living, so it fills with the dead, and sanitary science can not save us from perpetual danger while the homes of the dead violate the laws of nature. The air will be poisoned by the gases that are liberated without the purifying influence of the chemical processes of the earth; the fountain-head of water will be tainted; the germs of disease will be turned up to the surface of the earth with every change that is made in our cemeteries. The time is coming very rapidly when we must face the sanitary problems involved in our methods of sepulture. Personally, I hope to see the introduction of cremation. For, seeking to use my life in some real, earnest work for my fellows, it would be grief to me to think that my remains became a source of danger to any human being who followed me upon the earth. No possible conception of duty towards the dead stands in the way of a reasonable solution of the problem of disposing of the physical remains of the dead. The forms of disposing of bodies are hut forms. By one way or another the inevitable process will be passed through, and the body will be restored to the common fund of nature, whence new generations shall draw the interest of life."

COLD WET WEATHER.—When cold weather is accompanied by much moisture in the air, it acts most depressingly on the nervous system of sensitive delicate persons. There are at least two reasons for this: one is the absence of the sun's rays and heat which act as powerful but healthful stimulants to the nervous system, keeping it up to a normal standard of activity; the other is the direct loss of bodily heat by a cold, moist atmosphere deprived of sunlight. Sensitive, delicate persons do not generally manufacture so much heat as others, and whenever it is abstracted by cold too rapidly the persons suffer great depression, and all the functions of the body are lowered. Circulation becomes defective, digestion less vigorous, breathing embarrassed, the muscles disinclined to action, and the nervous system deranged. Heaviness of spirits, gloomy views of life, listlessness and languor prevail. If such persons could be transported to a milder climate the load would be taken from them, and they would enjoy life. If this cannot be done, the best thing is to so far strengthen and harden the body and invigorate the will so as to become irresponsible to the weather.—*Herald of Health.*

BORAX AS AN ANTI-CHOLERA SPECIFIC, is recommended by an Italian physician, in doses of five or six grams—about 77 grains—a day. He believes that it destroys the microbes in the intestinal canal and even in the blood, and grounds his faith on the experience in seven contiguous borax factories in an Italian village during the terrible epidemic of 1884-5. The workmen in these establishments were quite free from the disease, which carried off a third of the inhabitants in and about the village.

HOW THE LUNGS BEGIN TO BREAK DOWN.—Dr. Curtis says: "In the ordinary healthy lung, perhaps even in persons who have a consumptive heredity, the germ which causes the break down of the lung may not be able to make an impression; but if the physical integrity is destroyed by poor food or any debilitating influence, or by a cold, then the germ is able to get in its work, and to multiply and produce its kind and to fill the lungs with tubercles."

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MIDDLE BAR TUNNEL.—Amador Ledger: The rich strike in the big tunnel has revived the hopes of all concerning the future of this mining district. It seems that the point in the lower tunnel is over 600 feet vertical depth from the upper tunnel level and the strikes in the upper and lower tunnels are over 500 feet apart following the direction of the vein which pitches considerably to the north. What developments are in store in this unexplored space time alone can tell, but all the circumstances tend to prove that the two strikes are portions of the same vein. In the big tunnel, about 100 feet from the header, small seams of quartz mixed with black metal were encountered. These seams took a bend to the west, following the slate; the tunnel was continued in a straight course, and so the ore was lost until the slate was again struck last week. The same thing occurred in the tunnel above, and where the slate curved was found that the richest deposits of gold. It is believed that it will be found the same with the big tunnel, and that when the bend of the ore seam comes to be followed further and probably richer developments will be made.

QUARTZ MOUNTAIN.—This mine and mill has again been started up, after several months' work of preparation. It has been started up under the management of Messrs. Cummings and Jackson. Duncan concentrators have been put in at the mill, and they were started a few days ago, in charge of an expert from San Francisco sent up by the manufacturers. Considerable trouble is experienced in saving the sulphurets. They are so light and fine that in saving them a large proportion of sand is saved at the same time.

GOVER.—A fine body of rich ore was struck in this mine a few days ago, which has materially brightened the outlook for this property. We have not learned the dimensions of the new ledge.

MISCELLANEOUS.—A clean-up is being made at the Bartlett gravel claim at Slabtown. The present prospects are that it will turn out fairly. The South Spring Hill mine and mill were idle from Sunday to Wednesday. The stoppage was necessitated in order to put in the new reels preparatory to changing from flat to round wire cable for hoisting purposes. Everything was started again Wednesday. It is reported that a considerable advance on the million-dollar offer mentioned in our last issue for this property has been made. The Bunker Hill keeps 30 stamps running, but little improvement is apparent in the mine. Joseph Carrara is plodding along at the North California, working the rock at the Potosi mill. The quartz would pay pretty well, were it not for the frequent annoyances and stoppages caused by the breaking of some portion of the mill, which is old and worn out.

Mariposa.

SAXTON'S CREEK.—Mariposa Gazette, May 1: We learn through an informant who has visited the Schroeder, Diltz and other mines in the vicinity of Saxton's creek, that the winter's rain has developed extensive quartz ledges which were covered up with deep soil that has been removed by the force of the Little Giant and the water process. The Schroeder mine more particularly, which has a complete outfit of hydraulic machinery has been put to the test in washing down high embankments of dirt and some terrific slides, has exposed and laid open to view acres of what is called "blanket ledge," which lies at an angle of 30 to 35 degrees on the east side of the mountain overlooking Saxton's creek and the Merced river. What these extensive fields and masses of quartz are going to amount to will require time to tell. These flat blanket veins are rather a new feature in formation, as they lay piled up in various thickness, one on top of the other, to an unknown depth. The Diltz mine is the first that has shown rock of this character. With sufficient water some remarkable developments in mining would be made in this new section of country.

Inyo.

FURNACE.—Inyo Independent, May 1: The furnace at Lookout was started up for a run on Tuesday of last week. During the past two months or more Mr. Fitzgerald has been getting out plenty of good ore and the present run is liable to be the best ever made at the furnace.

CHRYSOPOLIS.—Work will be resumed at the Chrysopolis mines immediately. Mr. Chambers, brother-in-law of Mr. Bolinger, has authorized Mr. Eibeshutz to go ahead with the work and do all that in his judgment may be necessary for working the mines. Mr. Chambers himself will come here as soon as he can get matters arranged that now detain him at the Ontario mine, Park City, Utah.

NEW MILLS.—Register, April 29: We are informed that George Storey has new machinery on the way from San Francisco for a mill for the Poleta mine, to be erected just across the river from this place. He is a man to make the whole business a success. It is said the mill at the Casey mine will be ready to start up in about four weeks.

Mono.

THE STANDARD CON.—Bodie Miner, May 3: Report of Standard Consolidated Mining Company for the week ending Saturday, May 1st, 1886: Men employed 1; and about the mine: Engineers, 2; pumpmen, 1; shiftboss, 1; carpenter, 1; blacksmith, 1; miners, 25; stationers, 3; carmen, 5; timberman, 1; laborers, 1. Total employed, 41. The average of the ore bodies continue without change as regards both size and quality. Ore milled for the week 269 tons.

THE MONO.—Report for the week ending this date, May 2d, as follows: The southeast drift 700 is extended 20 feet. The west crosscut from south drift 700 is extended six feet. There were employed 11 miners, 2 carmen, 1 blacksmith's helper, and jointly with Bodie Con. 2 engineers, 1 carpenter, 1 fireman, 1 miner, 1 watchman, 1 carman, 1 foreman.

THE BODIE.—Following is the report of the Bodie Con. for the week ending May 2d, 1886: The east crosscut above 300 is extended nine feet. The Bodie north drift, 650 Mono, is extended seven

feet. There were employed three miners and one blacksmith, and jointly with the Mono, 2 engineers, 1 carpenter, 1 carman, 1 foreman, 1 watchman, 1 miner.

THE CON. PACIFIC.—For the week ending May 1st, we have to report an advance in the crosscut of six feet; making total length of drift 58 feet. The winze being sunk from the 135 foot level, on the Fortuna vein is now down nine feet in ground looking and working fairly.

Nevada.

THE COE MINE.—Grass Valley Union, May 4: The directors of the Coe Quartz Mining Company of this district have voted to set aside 40,000 of the 100,000 shares of the capital stock to raise a working fund to put up hoisting and pumping works upon the mine. It is the intention to use the money for building of works that will be run by water power from the South Yuba canal, the water to be brought in a ditch along the ridge north of the mine, and then emptied into a receiving works at an elevation of 240 feet above the works, to which a pipe-line will be laid and ample pressure obtained. It will be the present intention to work the mine down to the 4th, which is the lowest level opened, and is 304 feet from the surface, and in which there is a large extent of ground opened, but the shaft is down 200 feet below that, but no levels run. There is a large extent of ground opened, and when the shaft is pumped out to the fourth level it would be but a short time when the mine could be made to yield a large amount of ore. The mine formerly produced good ore, but it was not under skillful management, and the property which has always been considered good, has been permitted to remain idle many years until recently it has passed into the hands of the present company, who leased a portion of the ground above the first level, from which high grade ore is now being produced, scarcely any of the rock but what shows well in free gold.

THE BADGER.—Grass Valley Union, May 1: The machinery has all been placed at the Badger by Wm. S. May and Thos. Walker, who had the contract, ready for starting. The wheel wheel for running the mine is a six-foot Pelton wheel and the fall is about 60 feet, which will, it is thought, do the work of hoisting and pumping. The pipe will be connected with the works in about a week, when a number of men will be employed at the Badger.

YIELDING GOOD ORE.—The Orleans mill is running regularly on good pay ore from the Prescott Hill mine, which is extracted from the second level below the drain tunnel. The ledge is not large, but it is of excellent quality, having made decided improvement in the last two months.

San Bernardino.

A FINE PROSPECT.—Calico Print, May 2: Several months ago A. G. Rhodes and Geo. Plant went out prospecting and discovered some good prospects in the southeastern part of Death Valley, about 80 miles northeast of Calico. The district has been named Hope Springs, and the claim on which they are working, Black Metal mine. The mines are situated seven miles from a good spring. A shaft has been sunk fifteen feet, and the ore taken from the same samples well. Mr. Rhodes recently brought to the mill at Daggett 1,200 pounds of ore from the mine, the pulp assay of which went \$132.47 to the ton. From present indications the mine will yield considerable ore that will average \$100 to the ton. The belt in which this mine is located has been prospected for two miles and ore discovered at intervals its entire length. The owners of the group are A. G. Rhodes and Geo. Plant, who own one-third each, Mrs. Humiston and her nephew, Wm. Kelly, who own the remaining one-third. The owners of this new find are pleased with their prospects and will prosecute developments as long as they show up as well as at present.

Shasta.

IRON MOUNTAIN.—Shasta County Democrat, April 24: Operations at Iron Mountain have ceased for the present, all hands discharged and the mill shut down. We are informed that the cessation of operations is only temporary. Tom Green's five-stamp mill and double discharge battery arrived last week, as did also the five-stamp mill, single discharge battery, for the Brown Bear Mining Company of Deadwood, Schattuck & Shearer, who recently purchased the Reche mine near the County Hospital, have ordered hoisting and pumping machinery which they will place on the mine as soon as possible. The Texas and Georgia Mining Company's mine, at Old Diggings, was damaged by the late storm to the extent of about \$500, by the loss of four tons of sulphurets and the washing out of ditches and an ore dump.

Sisra.

BALD MOUNTAIN EXTENSION.—Mt. Messenger, May 1: The B. M. Ex. Co., of Forest City met with a little detention this week, owing to the breaking into the main tunnel of water which had accumulated in the old workings of the South Fork ground about 4000 feet from the mouth. When this ground was worked out and abandoned a drain was left, which, it was thought, would take all the water that would come from that source. It seems that this drain became clogged, backing the water up until it accumulated in such quantities over the main tunnel as to force its way down an old prospect shaft and into the tunnel. When it first broke in, it came in a perfect torrent, running two feet deep over the track for many hours. No difficulty was experienced in getting the men and animals out and all the injury, besides the delay was the covering of the track for quite a distance with soft bed rock. The timbers were not disturbed not even a spilling broken. A tunnel to connect with the old works was rapidly run, to tap the accumulated waters, and work was resumed.

Trinity.

A RICH SECTION.—Trinity Journal, May 1: Thanks to our friend C. W. Day, of Junction City, we had a pleasant ride to that town on Monday last. During Tuesday, we crossed the river on the great suspension bridge of the Hayes Red Hill gold mines, and visited the mine now being worked under the immediate management of Foreman J. R. Flagg. A great quantity of ground has already been worked this season, and much more will follow, as Canyon Creek from which their water supply is drawn is one of the best streams in the county. On the day of our visit the water was not turned on, as all hands were busy moving the giants and water-gates on the bed-rock nearer the banks. A brief examination of the side

ditches showed gold quite plenty—sufficient to indicate the paying nature of the ground already worked and to give promise of a rich harvest for the season work. Superintendent Benjamin is in charge of the works. From Red Hill we learned that more work was being done in the Bartlett & Evans, Leibbrandt and other mines than for several years past, and that they were paying fabulously. The same was said of Uncle Jo. Sturtevant's, Chapman & Fisher's and Sheridan Bros. mines further up the river. Cuth Given and Dave Sutherland have re-opened the mine on the point this side of Junction and will run it two or three months. Mr. D. A. Reed is making a success of his fluming operation in the bed of Oregon Gulch, having already struck bed-rock and so far meeting with much fewer obstructions and drawbacks than were anticipated when he commenced the undertaking. At the Gillivray ranch, Nick Lorenz is preparing to put in an elevator and open a mine near where the dwelling stands as the ground there is very rich. Fred. Hass, near the mouth of Oregon Gulch is working very rich ground this season and moving a great deal of it, his water supply this year being much better than for several previous seasons. On Oregon Mountain, Superintendent Loweridge is doing splendid work and making it pay better than ever; the present will prove a prosperous season for the Trinity Gold Mining company as well as for all others in that district. It is of course yet early to estimate with much exactness upon the product of mines, but enough has been done to show that all are paying well, and many thousands of dollars have already been cleaned up. The district within a radius of four or five miles of Junction City has more paying gravel than any other section of this county, and will this year produce not less than \$200,000 in the opinion of those who are in a position to know.

NEVADA.

Washos District.

HALE AND NORCROSS.—Enterprise, May 1: On the 2900 level the main lateral drift northward has been advanced 35 feet beyond crosscut No. 4, and is running in vein porphyry and low grade ore. A crosscut west from it will be started during the coming week into the main ore vein, which lies on the west side of this drift. The ore body developed in upraising and stoping above the 3100 level continues its excellent showing, and the good ore met with shows for itself. It is of the old-time granulated texture and rich sulphuret character, assaying up in the hundreds, and any extensive concentration of it will simply be a genuine bonanza, which the indications, both inherent and surrounding, promise the finding of in that vicinity before long, for, surely, where so much smoke is met with the fire cannot be far away. The best ore, met with in bunches, has been carefully selected and stored away in the lower drifts, waiting for an opportunity to raise it to the surface. During the past week this opportunity has been given by a cessation of advancement in the south lateral drift in Potosi, in order to put in drain boxes, and about 150 tons were hoisted to the surface through the Combination shaft, relieving the drifts considerably. More will be brought out as occasion offers, and in due time, when milling facilities shall be secured, the true bullion merits of all this ore will be satisfactorily ascertained.

POTOSI.—Only 15 feet of advancement was made in the main south or southwest drift on the 3100 level, owing to moist ground being met with in the face. It was deemed most advisable to stop and put in drain boxes throughout the drift from its connection with the Chollar. Should much of a flow of water be met with in a further advancement south crosscutting will be commenced in both this and the Chollar mine, cutting eastward into the main ore vein, along the west wall of which this drift has been run. A very short time now will decide this important proposition.

GOULD AND CURRY.—On the 600 level the main southeast drift continues advancing in vein porphyry, quartz and clay, showing some mineral. The crosscut west was suspended in a dry, hard porphyry formation, and a drift north started from it at an eligible point about 16 feet from where it left the main southeast drift. This is now running in porphyry and mineralized quartz.

CON. CALIFORNIA AND VIRGINIA.—About 400 tons per day continues to be the regular yield, the average value of which, according to battery samples at the Eureka and Morgan mills, being about \$14 per ton. Bullion worth \$41,000 has been shipped since last report. The exploration work on the 1400 and 1650 levels makes good progress, as usual.

CROWN POINT AND BELCHER.—About 350 tons is the present daily yield. The old ore stopes of the upper levels are holding out well, and an abundance of good milling ore is opened up by the explorations on the 1500, 1600 and 1700 levels.

YELLOW JACKET.—About 140 tons continues to be the daily yield from the old workings above the 1300 level. Exploration work goes ahead as usual at various eligible points, opening up more ore resources.

BEST AND BELCHER.—The pumps in the Osbiston shaft continue their effective work, and less than 75 feet of water remains to be raised in order to find the bottom of the shaft.

MEXICAN.—The main lateral joint Mexican and Ophir drift to the northwest is going ahead in regular vein material, and a new drift to the south has been started.

ALTA.—The main north drift, running now in Benton ground, has less than 100 feet further to run to connect with the old Lady Washington workings.

OPHIR.—On the 300 and 400 levels good, effective exploration steadily goes ahead in various eligible directions, with no important result to record.

KENTUCK.—The old upper workings give a steady daily yield of about 65 tons, the ore breasts and stopes looking and holding out well.

UNION CONSOLIDATED.—On the 500 level the crosscut east from the north lateral drift continues in vein porphyry, with some quartz and clay.

SIERRA NEVADA.—On the 520 level west crosscut No. 2 is now in 427 feet. Material, dry, hard quartzite and porphyry.

MONTE CRISTO.—Some ore is being extracted from the old mine for milling.

Bristol District.

TAILINGS.—Pioche Record, April 30: The roast-

ing of tailings at the Bristol mill has proven a perfect success. The only difficulty experienced is that the roaster is not of sufficient capacity; but now as it has proven a success, Mr. Charles Roe will construct a roaster of treble the capacity of the one now in operation.

Eureka District.

ANOTHER FURNACE.—Eureka Sentinel, May 2: It is said that the Eureka Con. Company will have added to their reduction works another furnace within 90 days, which will be used solely for the working of the speiss in their dumps.

RICHMOND.—The ore bins at the Richmond reduction works are full, and for the present no ore is being shipped down from the company's mine. It is probable two of the furnaces will be fired up about May 20th.

Esmeralda District.

AURORA.—Walker Lake Bulletin, April 28: Everything is moving along comfortably at Aurora. The result of work in both the Humboldt and New Esmeralda has been very encouraging, and the managers of the New Enterprise are very confident in the final outcome, being fully as good as was predicted in the start.

Hiko District.

PROSPECTS.—Cor. Eureka Sentinel, April 29: I had the pleasure of visiting Hiko not long since, and was agreeably surprised at the extent and richness of the mines. Among the most prominent are Gray Eagle, Buckeye, Twin Eagle, Baldback, Mono and Oohir. There are several patented claims in the district that are owned by New York and Chicago companies, but the owners prefer to remain passive until the advent of a railroad through that section. There are also several good prospects on Irish Mountain, among which may be mentioned the Vermilion. This claim shows a face of carbonate ore four and a half feet thick but will average \$40 per ton. The formation is lime, and the ledge croppings are over 100 feet in height. This ledge, in my opinion, will some day prove a bonanza, but at present it is not worth two bits to its owner, for even \$100 rock will not pay to ship from Hiko to Salt Lake City. From the fact that most of the ores of the district are pretty base and almost self-fluxing, the erection of a 20-ton furnace at Logan or Hiko would, in my opinion, be just the thing for that section.

Jefferson District.

MILL.—Belmont Courier, May 1: The little mill at Jefferson was started up this week. Bullion shipments will soon be in order.

Park Canyon District.

OPERATING.—Belmont Courier, May 1: The Giant Company continue to operate their mill and mine in Park Canyon.

Pennsylvania District.

FIRST BULLION.—Pioche Record, April 30: Three bars of bullion arrived from Pennsylvania District, and was valued at nearly \$3000. It is the first shipment ever made from that district, there having never been any works in the district until those recently erected by G. R. Barton. In early days the ore of that district was taken to Bullionville and reduced by the mills there. The bars contained about eighteen ounces in gold.

Pioche District.

BULLIONVILLE.—Cor. Eureka Sentinel, May 2: Bullionville is appropriately named, for there has been shipped from here during the rainy days of Pioche something in the neighborhood of \$12,000,000 in silver bricks. It will most likely be heard from again in the role of a bullion producer, the Godbe Company having erected one of the latest improved Stedefeldt furnaces for the chloridization of some 200,000 tons of tailings that assay \$12 per ton. This furnace, together with a large leaching plant, was set in motion a few months ago, but after a short run the company had to temporarily suspend operations in order to make some changes in the draught of the furnace, as well as to secure a competent manager, the party in charge having entirely failed to give satisfaction. Metallurgical experts are expected from Salt Lake, and as it was satisfactorily demonstrated by preliminary tests that the tailings can be chloridized and leached to a high percentage, it is safe to predict a success for the company. In a former letter to the Sentinel I predicted a success for Mr. Barton, who was then engaged in erecting a five-stamp mill on the old Klingensmith mine. I had the pleasure last evening of baving my predictions realized in the shape of three bars of bullion, valued at \$5,000, which is the proceeds of 17 days' run. Mr. Barton's confidence in the mine is such that he is going to add five more stamps to the mill, having enough \$50 ore in sight to run for several years. There are several other good claims in the district that only need to be opened to prove paying properties.

Spaulding Mining District.

A NEW DISTRICT.—Silver State, May 1: A letter received from Unionville says that a meeting of miners was held at Spaulding Canyon, and a new mining district was organized named "Spaulding Mining District." The south boundary of this district is on the divide between Sulphur and Spaulding canyons, and runs north ten miles to the divide north of Rockhill; east from initial point and north monuments five miles, and west five miles, making ten miles square. L. A. Purchett was elected District Mining Recorder, and F. Springer has been appointed as Deputy Recorder.

Tsm Pahuts District.

WORKING.—Cor. Eureka Sentinel, April 27: The mines of Tem Pahute, so far as developed, are unquestionably the richest of any camp in Southwestern Nevada, but in consequence of their isolated position, it being 100 miles to Pioche and 200 to the nearest point of railroad, very little has been done in the district. The principal mines of the camp are the Sterling, Standard and Legal Tender. From a disinterested gentleman who lately visited those mines I learn that the owners, Messrs. Smith, Service and Foucher, are at present working on the Sterling, formerly known as the Inca, at a point 150 feet from the surface; that the ledge is five feet of solid quartz between two well-defined walls, and that the ore as it is shot down will mill from \$80 to \$100 per ton. South and immediately joining the Sterling is the Standard, with one of the same character and quality. On the north lies the extension of the Legal Tender, with a ledge eight feet in

width that will assay \$50 per ton as it is shot down. One ton has been shipped from all three of these mines that milled over \$300 per ton. This is a pretty big showing, but when the fact is taken into consideration that \$100 ores are worthless to-day on the dumps at Tem Pahute, it is not so big for the poor men who have stayed with their mines for over 15 years. It is my candid opinion that with an abundance of wood in the mountains, and water which can be brought to within four miles of the mines by piping it four miles, Tem Pahute presents a rare opportunity for a legitimate company of miners.

TUSCARORA DISTRICT.

BELLE ISLE.—Tuscarora Times-Review, Apr. 30: North drift from east crosscut No. 7, 450-foot level has been extended six feet, No. 1 winze, 150-foot level, has been sunk five feet.

GRAND PRIZE.—North drift on the 200 level extended 20 feet. An upraise has been put up 19 feet above same level, and a crosscut run west 23 feet from the east lateral ledge. Stopos producing but little ore at present.

NAVAJO.—North drift on the east vein from No. 5 crosscut 350-foot level has been extended nine feet. South drift from Johnston crosscut has been extended sixteen feet.

ARIZONA.

SHIPMENTS OF RICH ORE.—Prescott Courier, April 30: With the opening of spring comes livelier times in Turkey creek and adjacent districts than we have seen for many months past. The chlorides are all hard at work in the different camps of Turkey creek and throughout the Bradshaw range, from the Goodwin mine to the Tip Top camp. Krunk Holler is the liveliest camp in this district, for the boys are taking out plenty of rich ore. Roberts & Given are driving a tunnel on the "Might Be," a strong vein of high grade carbonate ore. They have three tons ready for shipment which Mr. Given thinks will go \$400 per ton. The adjoining claim south—the Lookout—is owned by Powell. The claim looks well. One mile south of the Pine Spring mine, Alec Denny is working the Black Rattler. Mr. Denny has just shipped a large amount of ore from this mine to Socorro, and will make another shipment soon. McCann & Powell, on the Hawk-eye, have a large amount of high grade ore on the dumps ready for shipment. Morgan & Campbell, on the Wheel of Fortune, have several tons of high grade ore on the dumps, which they will commence sacking next week for shipment to Socorro. Herman Von Metz is running a tunnel on the Miners Star, a strong vein of chloride ore south of the Longfellow mine. Scarcity of sacks prevented Mr. Metz from making a large shipment last week. Tom Roach is sinking on the June Bug, a strong vein eight feet wide; the shaft is being sunk on the hanging wall. Mr. Roach will stop crosscutting to the foot wall this week; the ore is ruby and born silver. Ryan & Randolph will make their second shipment next week from their claim, the first south extension of the Roach mine—the richest mine in the district. Mr. Dawes made a rich strike in the Peck mine, on the level above the north tunnel. Harry Norton is chloriding north of the Peck, on Turkey creek, and making money. Ed. Gobin has 20 men at work in his gold mine in the Bradshaws. His mill keeps pounding away day and night. News comes from Walnut Grove that A. W. Callen is about to start up his mill in the Juniper Spring camp. Mr. Callen has very good property in that camp, adjoining which is John Mahoney's gold and silver mines, as rich and well defined mines as any in the county. We may look for lively times at Grizzle's camp this coming summer. Lester Jackson and John Curtin are working the War Eagle mine. They are fixing up the Bradshaw Basin mill, and will soon drop the stamps. The McKennin boys are taking out plenty of rich gold ore from their claim on the War Eagle, south of Jackson & Curtin. Frank Ryland and Dan Martin are fixing up camp in the Bradshaws preparatory to starting work on their gold mine.

GROOM CREEK DISTRICT.—Prescott Courier, April 30: Messrs. Kelly & Stephens and Mr. John Hutchins have leased their Nevada mine, for one year, to Messrs. Holaday & Raley, two thorough miners, who have tested the mine and feel certain of being able to take out of it a great deal of rich gold rock, which they will have worked at one of the mills on the creek. Lessees of the Kelly mine are stopping down good gold rock. The mill and concentrators are ready for work. Near Copper Basin, Frank Alters has just tapped the tunnel in the Catocin mine by a 60-foot shaft, and can now stoppe down as much shipping ore as he wants. The mine has paid from the grass roots, and will do tie to. Mr. Layton is shipping silver ore from his mine in Hasayampa district, and Frank Kuehne is taking very rich gold rock from a mine on Lower Lynx creek.

TOMBSTONE.—Democrat, May 1: The strike in the Uncle Sam, mention of which was made some weeks since, proves to have been by far the most important development that ever took place in that portion of the district. The Uncle Sam is owned by United States Marshal Meade and others, but is being worked under lease by the Harris brothers. It is an east and west location, one of its side lines forming the north end line of the State of Maine, the shaft where the strike was made being within 60 feet of the latter claim. The ore was encountered at a depth of 62 feet, in the bottom of a perpendicular shaft. The ore body, as at present developed, consists of a 12-inch streak or seam assaying about 1,200 ounces. No drifting on the ledge has yet been done, the lessees still being engaged in sinking. About 20 tons of this rich ore have been taken out. The ledge shows every indication of permanency. The owners and lessees are to be congratulated on their good fortune.

THE HILL MINES.—In conversation with Charley Leach, foreman of the Grand Central, a reporter of the Democrat yesterday learned that the pump rods are now in place, but the couplings have not yet all been made. Everything will be in readiness for starting by the 10th instant, and possibly a day or two earlier. The hill magnates are extremely reticent in regard to their future plans, and but little can be learned of a reliable nature. There seems to be a lack of harmony among the superintendents. It is well known that if the pumps handle the water successfully they will drain, not only the Contention and Grand Central, but also adjacent properties. Such being the case, it seems but fair and equitable

that the owners of these adjacent properties should bear their just proportion of the cost of operating the pumps. Many well-informed persons believe this question is accountable for the vexatious delays and apparent lack of energy displayed in starting the pumps. In fact, it is stated on good authority that negotiations are now pending by which a portion of the expense will be borne by outside companies. When this arrangement is perfected, which will probably be soon, the last impediment to a thorough exploitation of the mines below the water level will have been removed, and from that time will be dated the dawn of Tombstone's most prosperous era.

COLORADO.

ORE.—Georgetown Courier, April 29: A six-inch vein of apparently rich ore was recently encountered in the 300-foot level of the Bismarck. Morrison Bros., lessees on No. 5 lode, Columbia tunnel, are stopping a vein of nearly solid ore, from two to five inches in thickness. They are now above the level about 135 feet. A late mill run returned in two classes \$384 and \$151 per ton. The lessees on the Muscovite lode, Democrat mountain, have opened a vein of solid galena two feet in thickness. Dan Glaze on the A. T. Stewart lode, Democrat mountain, has a vein of solid ore which averages two inches in thickness, and mills from \$337 to \$340 per ton, in two classes. Ganley & Co.'s lease on the Pay Rock is said to be one of the best in the county. They are taking out an immense amount of rich ore, and making big pay. Cohen, Ganley & Co.'s lease on the Pay Rock is still turning out abundance of good ore. A millrun this week of about 20 tons returned between \$400 and \$500. Fred. Vinas & Co., lessees on the Algonquin lode, Saxon mountain, are pushing ahead the 160-foot adit. The breast shows a vein of quartz impregnated with mineral, ranging from four to eight inches in thickness. J. M. Charles, who has been crosscutting to the north wall of the Magnet, has reached it and found a good streak of high grade ore. The STL, ouis lode, Capital mountain, is being opened up with a good force of men. A drift has been run 48 feet. The breast shows a vein two feet thick which carries several small streaks of solid galena, ranging from one to two inches in thickness, which mills from 40 to 100 ounces silver per ton and 60 per cent lead. Johnson & Peterson, lessees on the Johnson lode, east Argentine, are drifting west from the bottom of the 40-foot shaft on a solid vein of ore from two to six inches in thickness. A shipment of three tons was made this week. McNulty, Noone & Co. have driven 130 feet east and 20 feet west from the bonanza tunnel on the Fred. Rogers vein, through barren ground. A raise is in progress to connect with the old workings. McTigue, O'Mara and Kane are stopping out six inches of solid ore, 50 feet below the McVeaty shaft. The last millrun in one class returned \$185 per ton.

IDAHO.

BANNER.—Idaho World, April 27: Mr. Brown, of the Elmira Company, says ore will be crushed in the Banner mill from the districts being opened up in the vicinity of Banner, in large or small lots. The company will crush even the small amount of one ton. If Silver district comes up to expectations, ore will be packed to Banner for reduction, and it is very probable that crushings will also be made of ore from Archie creek, and the Silver Chief Company will have ore crushed in the Banner mill. M. Kemper and another man from Banner went over to Silver district last week. Mat. Graham, Jr., returned with them. Mose says the tunnel running to tap the Julien location is in 193 feet. They expect to tap the vein in a few days, and at the depth of 250 feet. This location is owned by the Grahams. Twenty-one locations have been made in the district. Irwin and Austin have three or four fine-looking locations. Town lots and mill sites have been staked off and water rights taken.

SMOKE NOTES.—Ketchum Keystone, April 24: The King of the West, worked by two leases, one by Joe Montgomery in the upper works and the other by Wm. Mitchell and James Dougherty who have the main vein, is developing into the biggest bonanza in this upper country. Mitchell and Dougherty have a lease on the upper works, the provisions of which allow them 25 feet in depth on the ledge and 75 feet on both sides of their shaft, above which level they are entitled to a percentage of all ores extracted. In sinking, they struck the big vein at a depth of 20 feet and were compelled to stop sinking in sight of ten feet of the finest ore that ever was struck in such a body in the Wood River country. They are drifting and preparing to stoep out what comes within their limits, while the owners, Messrs. Geo. Montgomery, Geo. Black and Woodward, are arranging to put a large force on the mine at once. The Trade Dollar, another of the above company's properties, is likewise developing an immensely fine body of ore, several feet in width, and a bonanza itself, the characteristic of which is wire and horn silver, which is found in all the ore.

MONTANA.

MINING NEAR HELENA.—Independent, April 29: The country in the vicinity of Helena has long since become noted for mineral production and is still maintained by a number of unrivaled properties, the fame of which extends wherever mines or mining create interest. But besides these great properties there are a large number of smaller ones, either producing steadily or being developed into mines that will yet add to the wealth of Montana and of their owners. The Little Jennie continues to prove herself a fabulously rich property. From \$1,000 to \$2,000 worth of ore is being taken out every day in the course of development. Work is being pushed on both shaft and tunnel on the Mount Helena lode and the indications point to a certainty that the property will produce an abundance of good ore within thirty days. The first shipment of rich gold ore from Mr. Taylor's Cora lode arrived in the city yesterday. It will be followed by plenty more as soon as the roads become more easily passable. The developments in this mine make a fine showing of ore, and it promises to be one of the best in the gold belt south of Helena that stretches from the Whitlatch-Union to McClellan gulch. The owners of the rich gold find at the mouth of Big Indian gulch have got a fortune, if they stay with it as they unquestionably will. The vein is not very wide, but it is mar-

velously rich. The preparations for the opening of Trout creek and for sluicing New York gulch, across the river, are progressing rapidly. The saw mill for the purpose of cutting the lumber is expected to arrive at Helena this evening. When operations fully begin this camp will again be one of the booming camps of Montana.

BUTTE MILLS AND SMELTERS.—Inter-Mountain, Apr. 29: All the silver mills with the exception of the Clipper and Dexter, are running with a full supply of ore. The Alice has all it can do to crush the ore produced by the Alice and Magna Charta mines. The Moulton and Lexington mills keep their stamps supplied from their respective mines and from custom ores. The Silver Bow mill has twenty stamps dropping on Belle of Butte ore, and the other ten are also kept at work on ore from mines belonging to the company. The Old Lexington mill has all it can do to keep pace with the production of the Pacific mine.

THE SMELTERS.—The Parrot, Clark's Colusa, Colorado, and Butte Reduction Works are in full blast. There is not at present, nor has there been for a long time past, any want of ore felt at the smelters. Indeed there are some of the copper mines here that could easily furnish more ore to the smelters than they are just now willing to take, owing no doubt to the low price of copper.

NEW MEXICO.

COARSE GOLD.—Silver City Enterprise, April 23: Demerrick brothers brought in some very fine coarse gold on Tuesday which was panned out on Whiskey creek. The scarcity of water alone prevents Whiskey creek from being a lively placer camp. Chas. Osborne, one of the discoverers of the Old Man mine, came in from Pinos Altos this week. Charley has done 120 feet of drifting on the Great Western, and expects to strike the ledge in about twenty feet, when he can soon determine whether his time has been profitably spent or not. The Socorro Bulletin pays the following compliment to a Silver City man: Walter C. Hadley supersedes F. M. Endlich as manager of Sierra Grande Mining Company. Mr. Hadley was at one time editor of the Mining World and afterwards of the Las Vegas Gazette. He will fill the bill to a dot. Col. Adam Clark, the discoverer of the Great American mine in the Swiss-helm, Arizona, is in the city. Adam says that the property is looking well, and estimates that there is \$500,000 worth of \$20 and \$30 ore now on the dump, which, of course, cannot be handled at the present time, on account of the high expense of transportation. A well has been sunk on the company's property containing forty feet of water, the supply of which is thought to be inexhaustible. Our townsman, F. W. Graham, and his associate, W. G. Stegman, have secured a bond on the Forest King mine at Kingston, running ten months. This property was formerly known as the Grey Eagle mine, and has been in litigation almost from the day of its discovery until these gentlemen took hold of it. The first car-load of ore taken from the mine, returns from which Mr. Graham has just received, netted the owners \$1,058. The property will be worked regularly hereafter by a large force of men. This property makes the twelfth producing mine in the camp.

MAGDALENA DISTRICT.—Socorro Bulletin, May 1: The Grayhound continues to yield its supply of excellent fluxing ore. The Graphic M. & S. Co. are working the Review claim with good results, and will soon inaugurate an active regime in the Sampson. The Imperial is worked steadily and the ore is dispatched to Socorro for treatment. The property is admirably managed by Gen. Cook. Bob Huston and C. A. D. Conklin recently struck a large pocket of high grade argentiferous copper in the Mackay mine, Pueblo district. Supt. Huber is letting contracts on the Iron King mine, in Gallinas district to the lowest bidder, and also desires bids for hauling ore from that property to the terminus of the railroad at Magdalena. The Graphic smelter will blow in one of its furnaces next Tuesday. The maximum capacity of the plant when completed will be 120 tons per day. The three stacks will be in operation by the 15th of next month. The Kelly, the old solid stand-by of the camp, ships mineral constantly to the Billing works of Socorro. The exploitation of the property is steadily kept in view, and new bodies of ore reserves are reached from time to time. Col. J. S. Hutchison is working ten men on his Summit claim on the Magdalena range. The dimensions of his ore dump are enlarging rapidly, and he proposes to ship two carloads of mineral weekly from this property to Socorro for treatment. The Graphic mine is working 40 men, and the force is to be increased in a few days.

OREGON.

QUARTZ AND PLACER.—Jacksonville Times, May 3: Prospecting continues everywhere. N. Cooke informs us that the miners of Willow Springs district are cleaning up and generally doing well. Nothing new has transpired in this line since our last report, and mining items are consequently scarce. Placer miners are cleaning up, though some of them have enough water with which to groundsluice and pipe. R. Cook has commenced a new tunnel in the Steamboat district, as his old one has become so long that he cannot work to advantage in it. Swindon & Sons of Rock Point Precinct and Bell & Moody of Jackson creek are having several tons of quartz tested at the Jacksonville quartz mill. Messrs. Casteel and Huggins have almost completed the tunnel in Timber gulch for the Jacksonville Milling and Mining Co. It will be 160 feet long. Frank Logg offers his half-interest in first-class Placer mines on Jackass creek for sale, together with all the appurtenances belonging thereto. Here is a golden opportunity for the right man. J. Blalock and Geo. Owings have struck excellent placer diggings at the head of Jackson creek, and are making good wages with a limited supply of water. Geo. Blalock, who has been prospecting on Grave creek for sometime, has struck what he considers the best placer diggings in the state. They prospect exceedingly well. W. Coker, one of the California company who propose to inaugurate a big mining enterprise in the vicinity of Kerbyville, arrived there last week. Walsh & Bragdon are still pushing work on their quartz ledges on Wagner creek, where a tunnel and shaft are being run. A mess-house is being completed and timber

for the mill building is on the ground. The machinery Messrs. Brandt, Kehler and others proposing in there is expected to arrive soon. The outlook for this district seems to be favorable.

UTAH.

BINGHAM ORE SHIPMENTS.—Salt Lake Tribune, April 30: The old reliable camp of Bingham is making a better record than ever as an ore producer. Persons familiar with the condition of the mines say that the shipments of ore from this time till January next will average in the neighborhood of 5,000 tons of ore per month. This estimate is based on what is now ready to ship and the condition of the mines. For instance, the Yosemite is blocked up with between \$30,000 and \$40,000 worth of ore, awaiting the drying up of the roads so it can be shipped. Their tramway, which is one and one-third miles long, is about ready to start, and will be put to running in the next ten or fourteen days if some machinery arrives which has been ordered to complete this elevated wire rope tramway. It will have a capacity of nine or ten tons per hour, or over 200 per day, and its lower end being at a good place to load teams, it will greatly facilitate the shipment of ore to the smelters. Their new concentrating mill is located at the lower end of the tramway, and, being ready, will be started next week. It has a capacity of 40 or 50 tons of ore per twelve hour shift, reducing to about ten tons concentrates. This mill is so located as to be reached by the railway should the proposed branch of the Bingham road be extended there. At present more than one-half the ore product of Bingham district goes by wagons to the smelters, and the road is anxious to get the handling of this ore. To do this it is proposed to run a branch from Revere, seven miles below Bingham, around into Butterfield canyon, a distance of five miles. This would secure the carrying of ores of the Yosemite, Brooklyn, Queen, Lucky Boy, Old Telegraph and several other mines in that part of the district. The Old Telegraph mine, which failed to be profitable under the management of the French Company, is being worked by a half dozen or more lessees, and that hill is now like a bee-hive, with its many workmen. These lessees will send out several hundreds of tons of ore per month this season. The ore is being worked at the West Cottonwood works, owned by the French Company. The process is that of leaching, quite different from any other leaching works ever tried here before, and which is reported as successful.

REVIEW.—Salt Lake Tribune, April 30: The receipts of bullion in this city for the week ending April 26th, inclusive, were \$159,850.18; of ore, \$16,057.99; total, \$175,938.17. The receipts of the week previous were \$143,378.37, of which \$123,999.37 was bullion and \$19,879 was ore. The Ontario shipped for the week 69 bars of bullion, 43,662.21 ounces, but no ore, a severe snow-storm at the Park having interfered with ore shipments from the Ontario and other mines. The Daly output for the week was 8 bars of bullion—12,040.45 ounces. No ore shipments. The output of fine bars from the various mines, as per current reports, was for the current week, \$55,508; of base bullion, \$10,700. The Hanaer smelter produced during the week bullion to the value of \$29,780; the Germania, six cars of bullion, \$14,888.37; the Pascoe, \$1,750 in bullion. The Stormont sent up during the week silver bars to the value of \$3,340. From the Kentuck, on the 23d, there was received a gold bar—\$16,000. There is nothing from our Horn Silver, and the stock appears much less lively in New York than for some time past. Ore to the value of \$3,040 was received during the week; Queen of the Hills ore, \$4,680; Nevada concentrates, \$920; Overland ore, \$7,750; lead and silver, \$5,607.99.

PARK CROSSCUTS.—Park Record, May 1: Farish & McLaughlin have run a crosscut south from the bottom of their shaft about 15 feet and cut the vein; it is three feet wide, carrying high grade ore. This further establishes the courses of the great Daly vein to the westward. The adjoining ground westward that is sure to carry the vein is owned by Woodward & Bogan. The development on the Morey group still continues. Jim has just completed a crosscut to the north from his main tunnel and the lode has certainly cut the Ontario. The vein is nearly four foot wide and shows splendid ore. The Ontario ninth level at its eastern face is close to Morey's western boundary. This is a fine opportunity for men of some means to open a good property. The Deer Valley Con. Co., after a steady five months application of the pick and drill, has cut the first vein that was headed for with a tunnel, at a distance of 200 feet from its mouth. The vein is 10 feet thick of carbonate ore, high in lead and fair in silver. The company will soon commence the movement of ore to the market and the tunnel will be driven on to cut the copper producing vein that is known to exist at a point some 200 feet further in the hill. This property is well situated for mining, being one mile from the railroad depot with very little grade to the works. The Jupiter Company has kept a force of men developing their property all winter. At present the showing is good for a heavy output of ore during the summer months. The property is under the general management of C. L. Street.

SAMSON ITEMS.—Charles Read, a heavy stockholder in the Apex and Sampson, came up from Salt Lake last evening to look over the field of his operations.

CRESCENT.—The Crescent tramway will be opened for the transit of ores Sunday night, all the snow having been cleared off and repairs made to the track. Considerable ore will come down from the mine the coming week and about the 8th the concentrator will start up with facilities for getting away with large lots of ore.

DALY.—This morning the force at the Daly was increased, and operations will be henceforth prosecuted with great vigor. About \$40,000 worth of Daly ore will be received at the Mackintosh sampler this month. The Marsac mill is doing good work on the Daly ore, and during the last week its output was eight bars, contained 928 fine ounces of silver valued at \$201.

ONTARIO.—The mill is doing good work before being shut down for repairs, in about ten days. From the 24th to the 29th inst., inclusive, the Macintosh sampler received 653.80 pounds of Ontario ore. The shipments of bullion for the past week were 77 bars, containing 4,620,149 fine ounces of silver valued at \$45,277.47.

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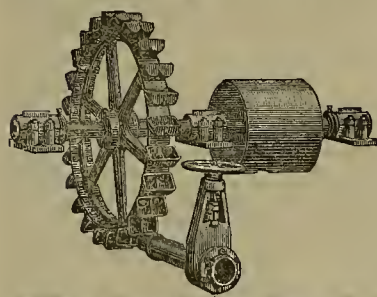
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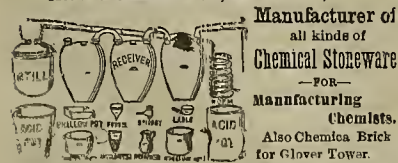
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Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Pulverizers, Churns, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the perforated Slot Cut and Shot Punched Screens. Mining Screens a Specialty, from 1 to 15 (Inch). Orders Promptly Executed

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Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

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Will attend to business in connection with mines in Sonora or Arizona.

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Personal attention insures Correct Returns.

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**ASSAYERS' MATERIALS, MINE
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Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

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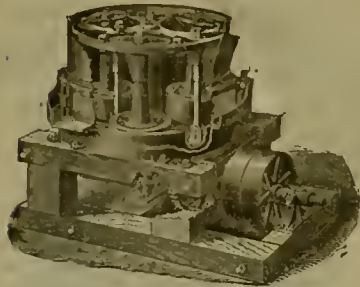
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These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assaying showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON,

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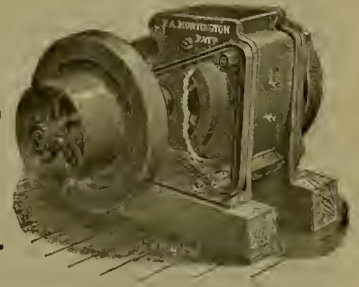
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Mining Machinery of Every Description,

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With Important Improvements, making it the

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Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

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VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

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THE GIANT POWDER COMPANY

Manufactures Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

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FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

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ANHYDROUS LIQUID AMMONIA.

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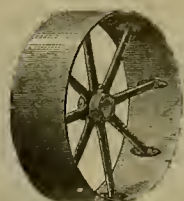
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PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

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SEND FOR CIRCULAR AND PRICE LIST.

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CALIFORNIA ARTIFICIAL STONE PAVING CO.

(SCHILLINGER'S PATENT.)

—FOR—

**SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE
DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.**

The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

OFFICE, 404 MONTGOMERY STREET, SAN FRANCISCO.

ROBERT JUDSON, President.

ALBERT H. REICHLING, Secretary.

O. GOODMAN, Manager

CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

- FOR WEEK ENDING APRIL 27, 1886.
- 340,556.—BOOT NAILING MACHINE—A. Cavalli, S. F.
- 340,861.—GATE—C. B. Clark, Williams, Cal.
- 340,699.—GRAFTING IMPLEMENT—O. H. Congar, Pasadena, Cal.
- 340,700.—GRAFTING IMPLEMENT—O. H. Congar, Pasadena, Cal.
- 340,868.—ELECTRICAL CUT-OUT—J. M. Fairchild, Portland, Oregon.
- 340,786.—APPARATUS FOR FEEDING WINE CASKS IN CELLARS—Geo. Johnston, S. F.
- 340,610.—STEAM AIR SHIP—Wm. Patterson, S. F.
- 340,676.—HOSE REEL AND IRRIGATOR—Jos. Perkins, S. F.
- 340,819.—STEAM ACTUATED VALVE—J. J. Reilly, S. F.
- 340,736.—WAGON AXLE NUT—F. O. Slanker, Pomona, Cal.
- 340,749.—MUSIC LEAF TURNER—L. L. White, Portland, Oregon.
- 340,847.—SCHOOL DESK—J. A. Wilson, Hood River, Oregon.
- 13,238.—TRADE MARK—North Shore Packing Co., Oakland, Cal.
- 13,239.—TRADE MARK—North Shore Packing Co., Oakland, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Mining Share Market.

The latter part of the week mining stocks showed an usual firmness and activity, with an advance in value that was refreshing to dealers after so much depression. The expressed opinions of mining magnates and experts who have recently visited the lower levels, amount to very little beyond the actual demonstration and developments made by the pick and drill. These have exposed a good large ore body in the upraising above the 3000 level, in which bunches of a high grade are found. The best of this ore has been selected and stored away in the lower drifts until an opportunity has at last been found to raise it to the surface, giving a much better chance to work in further explorations. The pumps at the Osborn shaft have been doing excellent work in reducing the water, and the prospects are that the bottom of the shaft will be seen in a very few days, after which sinking deeper will be the proposition. The low grade ore bonanzas at both north and south ends of the lode continue their regular bountiful yield, keeping hundreds of men and all the mills employed, and, although there is nothing new to report by way of encouragement, yet there is nothing particularly discouraging beyond the fact that the good prospects developed in the lower levels have not materialized into a veritable old-time bonanza as yet.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Daly, May 1, \$9200; Ontario, 1, \$45,277; Alice, April 24, \$44,134; Moulton, 24, \$29,930; Lexington, 24, \$27,648; Silver Bow, 24, \$10,320; Moulton, 29, \$18,750; Marsac Mill, 24, \$9307; Germania, 28, \$2805; Hanauer, 28, \$5070; Queen of the Hills, 28, \$1750; Overland, 28, \$1750; Germania, 29, \$2757; Hanauer, 30, \$5050; Queen of the Hills, 30, \$2330; Germania, 30, \$3215; Hanauer, May 1, \$5870; Queen of the Hills, 1, \$2480; Germania, 1, 4921; Hanauer, 2, \$6810; Silver Reef (for April), \$33,439.

There was shipped from Salt Lake City during the week ending May 1st, 32 cars bullion, 772,876 pounds; 12 cars matte, 378,060 pounds, and four cars of ore, 137,000 pounds. The banks report the receipt for the week ending April 28th, inclusive, of \$159,880.18 in bullion and \$16,057.99 in ore; a total of \$175,938.17.

New York Metal Market.

Telegraphic advices dated May 7th, give the following New York prices:

BORAX—6 3/4 @ 7 1/4 c.

BAR SILVER—\$100 1/2 per oz.

COPPER-LAKE—\$11.37 1/2 @ \$11.50.

IRON—No. 1, \$17 @ 18; No. 2, \$16 @ \$16.50.

LEAD—\$4.85 @ 4.95.

QUICKSILVER—43 @ 43 1/2 c @ lb.

The following is the latest from the "New York Metal Market Report":

COPPER—Dull; Lake offered at 11.35c. Transferable Notices (Lake) offered at 11.35; Transferable Notices (Chili Bars) offered at 12.42.

LEAD—Steady at 4.75 @ 4.80c. Transferable Notices (Domestic) issued at 4.80.

SPELTER—Flat at 4.45 @ 4.70c. Transferable Notices (Domestic) issued at 4.50c.

TIN—Quiet and steady at 20.70 @ 20.85c. After 2d Call, 10 tons Straits May sold at 20.70c. Transferable Notices issued at \$20.70c.

TIN PLATE—Neglected. Transferable Notices issued at \$4.35.

IRON CERTIFICATES—Dull and unchanged. Transferable notices (May delivery) issued at \$17.

SILVER—New York, 100 3/4 per oz. London, 46 1/2-16d.

MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$19 @ 19.50; No. 2, \$16.50 @ 17.50; Grey Forge, \$15.50 @ 17.00. Hudson River, Grade No. 1, \$18 @ 19; No. 2, \$16.50 @ 17.50; Grey Forge \$15.50 @ 16.50. Southern, Grade No. 1, \$18.50 @ 19; No. 2, \$17 @ 17.50; Grey Forge \$16 @ 17.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DEEDING.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Buena Vista Petroleum Co.	California.	33.	1	60.	Mar 16.	Apr 20.	May 10.	J. Morio.	326 Montgomery St.
Belmont M Co.	California.	11.	1	10.	Apr 30.	June 5.	June 28.	J. W. Pew.	310 Pine St.
Ber David M Co.	California.	11.	1	25.	May 3.	June 7.	June 28.	D. M. Kent.	330 Pine St.
Don Anador M Co.	California.	12.	1	25.	Apr 29.	May 30.	June 18.	F. B. Latham.	327 Pine St.
Crocker M Co.	Arizona.	2.	1	20.	Mar 10.	Apr 13.	May 21.	A. Waterman.	309 Montgomery St.
Champion M Co.	California.	21.	1	10.	Apr 13.	May 20.	June 6.	T. Wetzel.	522 Montgomery St.
Eureka M Co.	Nevada.	9.	1	100.	Apr 20.	May 31.	June 22.	E. H. Wilson.	328 Montgomery St.
Grand Prize M Co.	California.	15.	1	40.	Apr 9.	May 17.	June 7.	E. R. Grayson.	327 Pine St.
Gold Point M Co.	California.	23.	1	30.	Apr 20.	Apr 24.	May 15.	A. B. Brady.	Grass Valley
Gould & Curry M Co.	Nevada.	52.	1	40.	Mar 27.	Apr 30.	May 25.	A. K. Durbrow.	300 Montgomery St.
Lucky Hill M Co.	Nevada.	3.	1	05.	Apr 5.	June 7.	July 7.	F. D. Black.	27 Ellis St.
Mayflower Gravel M Co.	California.	30.	1	25.	Apr 30.	June 6.	June 25.	J. Morio.	326 Montgomery St.
McMillan S M Co.	California.	61.	1	20.	Apr 9.	May 14.	June 8.	M. Morio.	328 Montgomery St.
Martin White M Co.	Nevada.	24.	1	23.	Mar 16.	Apr 20.	May 20.	J. F. Scoville.	309 Montgomery St.
Manhattan M Co.	California.	9.	1	01.	Mar 20.	Apr 24.	May 15.	A. B. Brady.	Grass Valley
North Banner M Co.	California.	11.	1	13.	Apr 3.	May 6.	May 24.	J. J. Mitchell.	Grass Valley
Pennsylvania M Co.	California.	11.	1	01.	Mar 22.	Apr 4.	May 16.	M. Byrne.	Grass Valley
Potosi M Co.	Nevada.	23.	1	30.	Apr 15.	May 20.	June 20.	J. C. Elliot.	309 Montgomery St.
Perr M Co.	California.	5.	1	10.	Apr 13.	May 20.	June 16.	A. Waterman.	309 Montgomery St.
Santa Anita M & M Co.	California.	9.	1	02.	Mar 21.	Apr 27.	May 17.	J. M. Huntington.	309 Montgomery St.
Silver Hill M Co.	Nevada.	23.	1	10.	Apr 21.	May 26.	June 18.	W. E. Dean.	309 Montgomery St.
Union M Co.	Nevada.	33.	1	25.	Apr 19.	May 26.	June 22.	J. M. Huntington.	309 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Bismark M Co.	California.	A. K. Durbrow.	309 Montgomery St.	Annual.	May 19.
North Star M Co.	California.	D. A. Jennings.	401 California St.	Annual.	May 12.
Surprise M Co.	California.	G. E. Spiny.	310 Pine St.	Annual.	May 10.

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
California M Co.	Nevada.	A. W. Haver.	328 Montgomery St.	10.	Feb 23.
Don Virginia & California M Co.	Nevada.	A. W. Haver.	309 Montgomery St.	10.	Feb 12.
Derbec Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Feb 9.
Holmes M Co.	Nevada.	C. E. Hill.	309 Montgomery St.	25.	Mar 20.
Monro M Co.	California.	G. W. Sessions.	359 Montgomery St.	25.	Mar 10.
Nashua M Co.	California.	J. Nash.	414 California St.	25.	Feb 17.
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar 15.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR. 15.	WEEK ENDING APR. 22.	WEEK ENDING APR. 29.	WEEK ENDING MAY 6.
Alpha.	.65	.85	.55	.70
Alta.	.25	.25	.25	.20
Argenta.	.25	.25	.15	.15
Belcher.	1.10	1.10	1.01	1.11
Selling.	1.25	1.30	1.15	1.25
Best & Belcher.	.30	.40	.45	.40
Bollan.	.30	.40	.45	.40
Sonanza King.	1.10	1.20	1.05	1.15
Belle Isle.	1.10	1.20	1.05	1.15
Bodie Con.	1.10	1.20	1.05	1.15
Benton.	1.10	1.20	1.05	1.15
Bodie Tunnel.	.60	.65	.80	.70
Bulwer.	2.10	2.15	2.00	2.10
California.	2.10	2.15	2.00	2.10
Challenge.	1.10	1.25	1.00	1.15
Obampion.	1.10	1.25	1.00	1.15
Shoshone.	1.10	1.25	1.00	1.15
Confidence.	1.10	1.25	1.00	1.15
Con. Imperial.	2.10	2.15	2.00	2.10
Con. Virginia.	2.10	2.15	2.00	2.10
Con. Pacific.	.30	.30	.30	.40
Crown Point.	.30	.30	.30	.40
Day.	1.55	2.05	1.35	2.25
Eureka Con.	1.55	2.05	1.35	2.25
Eureka Tunnel.	.70	.80	.65	.75
Excelsior.	.70	.80	.65	.75
Grand Prize.	.70	.80	.65	.75
Gould & Curry.	.70	.80	.65	.75
Goodshaw.	.70	.80	.65	.75
Hale & Norcross.	.70	.80	.65	.75
Holmes & Norcross.	.70	.80	.65	.75
Independence.	.70	.80	.65	.75
Julia.	.70	.80	.65	.75
Justice.	.70	.80	.65	.75
Martin White.	.70	.80	.65	.75
Monro.	.70	.80	.65	.75
Mexican.	.70	.80	.65	.75
Mt. Diablo.	.70	.80	.65	.75
Northern Belle.	.70	.80	.65	.75
Nevado.	.70	.80	.65	.75
North Belle Isle.	.70	.80	.65	.75
Occidental.	.70	.80	.65	.75
Ophir.	.70	.80	.65	.75
Overman.	.70	.80	.65	.75
Potosi.	.70	.80	.65	.75
Pinal Con.	.70	.80	.65	.75
Savage.	.70	.80	.65	.75
Seg. Belcher.	.70	.80	.65	.75
Sierra Nevada.	.70	.80	.65	.75
Silver Hill.	.70	.80	.65	.75
Silver King.	.70	.80	.65	.75
Scorpion.	.70	.80	.65	.75
Syndicate.	.70	.80	.65	.75
Doga.	.70	.80	.65	.75
Union Con.	.70	.80	.65	.75
Uta.	.70	.80	.65	.75
Yellow Jacket.	.70	.80	.65	.75

Sales at San Francisco Stock Exchange.

THURSDAY A. M., May 6.	5'0 Hale & Nor.	2.40 @ 2.45
400 Alpha.	100 Holmes.	2.50
100 Alta.	50 MODO.	1.05
40 B. & Belcher.	50 MODO.	1.05
2250 Bodie Con.	50 Nevada.	1.05
950 Bulwer.	200 Ophir.	1.05
300 Bullion.	50 Overman.	1.05
220 Chollar.	850 Potosi.	1.05
150 Con Va & Cal.	850 Savage.	1.05
650 Con Pacific.	75 Sierra Nevada.	1.05
50 Confidence.	50 Syndicate.	1.05
300 Exchange.	50 Union Con.	1.05
600 Gould & Curry.	50 Yellow Jacket.	1.05

San Francisco Metal Market.

[WHOLESALE.]		THURSDAY, May 6, 1886.
ANTIMONY—Per pound.	12	—
Hallet's.	12	—
Cookson's.	12	—
BORAX—San Bernardino.	—	7 1/2
Armago.	—	6 1/2
IRON—Gleugarnock ton.	22	50
Eginton ton.	20	21
American Soft ton.	24	00
Oregon Pig ton.	—	—
Clippin Gap, Nos. 1 & 4.	22	00
Clay Lane White.	22	50
Shots, No. 1.	22	50
STREL—English, lb.	15	—
Black Diamond, ordinary sizes.	13	—
Plow.	5	—
Machinery.	8	—
Sanderson Bros.	13	—
COPPER—	—	—
Braziers' sizes.	17	—
Fire-ho sheets.	20	—
Shenling.	17	—
Ingot.	13	—
Notable Notices issued at.	13	14
LEAD—Pig.	4	00
Bar.	4	40
Pipe.	4	42
Sheet.	8	—
Shot, discount 10% on 500 bag.	2	05
Buck, 3 bag.	2	05
Chilled, do.	2	25
ZINC—German.	10	—
Sheet, 7 1/2 ft. by 10 ft. less the cask.	7 1/2	—
QUICKSILVER—By the flask.	—	34
Flask, new.	1	05
Flask, old.	8	—
TIN PLATE—Coke.	5	15
Charcoal.	5	15

PRICELESS—Muller's pebble eye glasses, 135 Montgomery St., near Bush, opp. Occidental. x

LUBRICATION.

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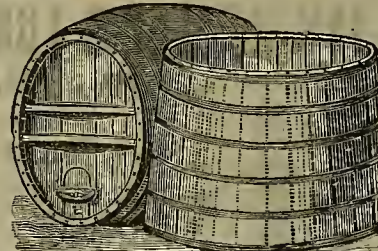
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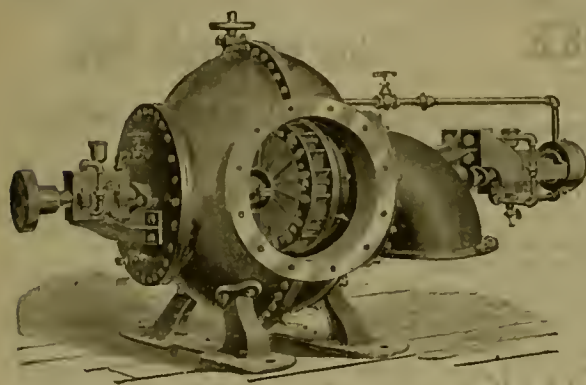
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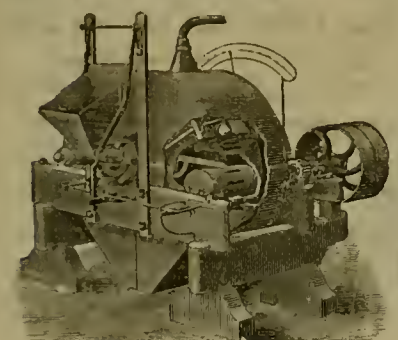


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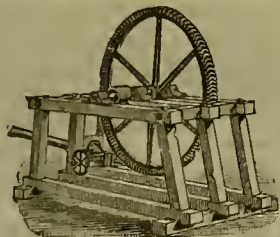
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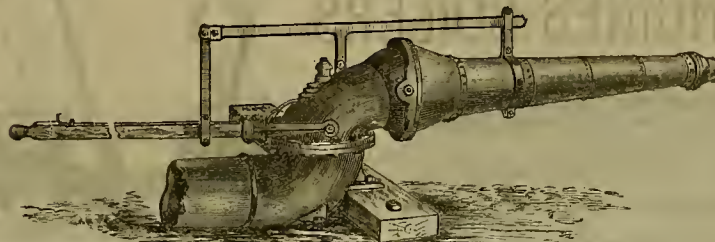
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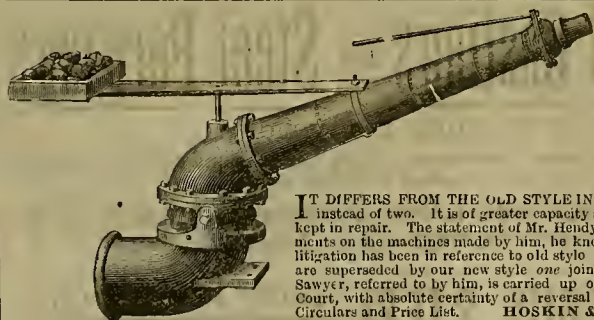
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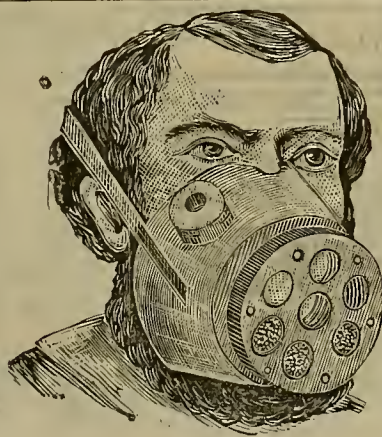
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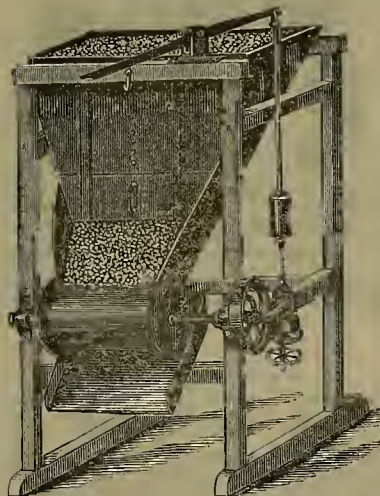
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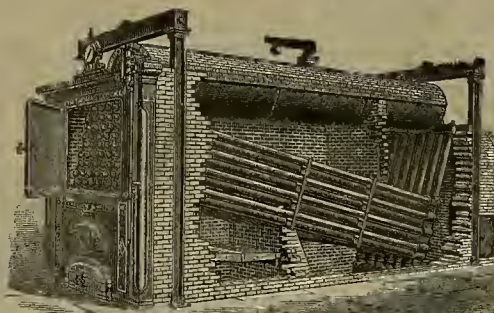
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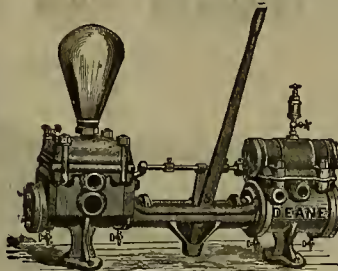
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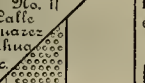
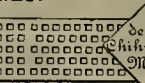
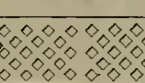
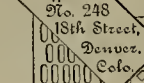
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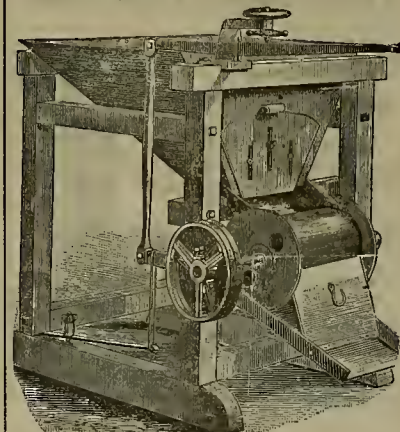
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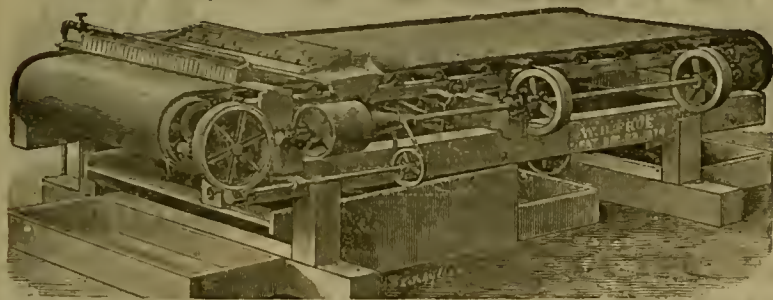
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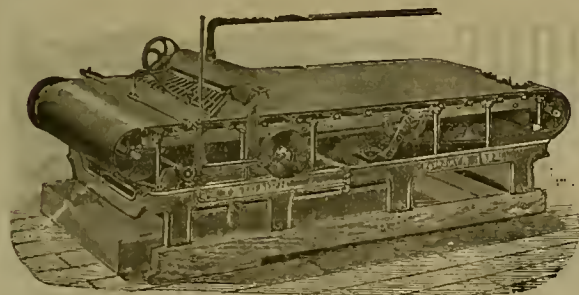
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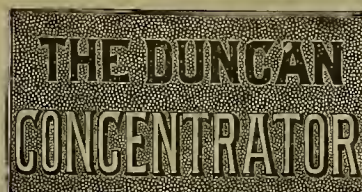
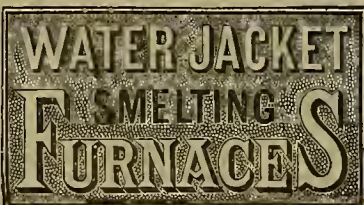
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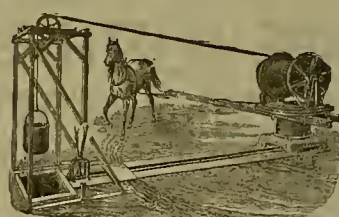
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores, DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



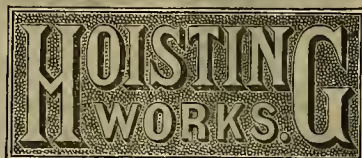
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machine EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all the AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



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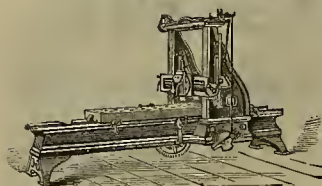
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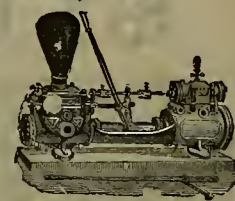
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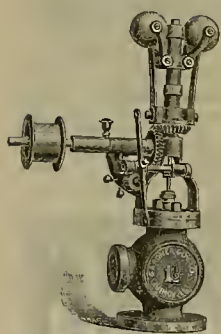
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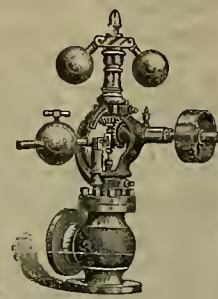
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The Mundy Patent has been sustained in the United States District Court of New York against the Ledgerwood Manufacturing Company, and also in the District Court in the State of New Jersey against Kendall & Roberts for infringement. Therefore all parties are cautioned against making, using, or selling Friction Drums that infringe this patent.



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MORRIS COUNTY MACHINE and IRON CO. New High-Speed AIR COMPRESSOR.

We have recently furnished the contractors the machinery for La Trinidad (300 tons per day) and Silver Queen (100 tons per day). These mines are located in Mexico and belong to La Trinidad Company, of London. The Process is the Wet Concentration, and the Plants are, without doubt, the most substantial and complete of the kind ever built.

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REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.
WILSON'S PATENT GAS-PRODUCER.
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, MAY 15, 1886.

VOLUME LII
Number 20

Mining Compass and Trigonometer.

Almost every mining engineer who has had charge of underground workings will have observed how often directions as to course and levels, deduced from careful theodolite measurements, have been elighted and disregarded by mine foremen and shaft bosses, and how often their tedious measurements had to be repeated, even for minor works, such as ventilation drafts and winzes, in order to carry them on with the required or desirable regularity. Besides the time and care absorbed by theodolite surveys, there is still another inconvenience, namely, the interruption of transportation during the time of observation, and, in heavily producing mines, the loss consequent on such interruption.

In a recent paper read before the American Institute of Mining Engineers, Erich G. Gaertner, of New York, recommends to the consideration of American mining engineers a subsidiary instrument to the theodolite; not a new one but one which has been in use in prominent European mines for decades, and has there fulfilled its purpose admirably. This is the mining, or hanging compass, as shown in Fig. 1, of the engravings. Keuffel & De Esser, of New York, have lately constructed this instrument in a form which adapts it for better use in this country. By the addition of the trigonometer, the hanging compass becomes at once an instrument which will prove of value even in the hands of foremen and practical miners, who have little or no knowledge of trigonometrical calculations.

Probably many will say that we have no use for needle instruments; that our modern theodolites are of such perfect description, and leave so little to be desired, that the introduction of a compass would look like a step backwards compared to the fine results obtained by angle-instruments. It is not pretended that the accuracy of the hanging compass is equal to that of the theodolite, or even sufficient for close measurements.

But as an auxiliary, especially in irregularly worked mines, where frequent approximate surveys are desirable between the more formal and precise ones, it certainly has an important use. Even in mines where local attraction would affect the needle, it is not seen why the angle of two adjoining courses might not be taken by observing on both sides and close to the apex. The variation of the needle, under ordinary conditions, even if caused by local attraction, is likely to be the same, if the points of observation are but a few inches apart.

The hanging compass is constructed on the plan of a ship's compass, hanging level at all times, and giving the course by means of a stout cord from which the frame is suspended. The graduation is in quadrants, as in most theodolites, instead of the European division into hours; and the vertical arc, provided with a plumb-line, of fine silk, allows a direct reading to quarter-degrees and an approximation from five to ten minutes. The manipulation of the instrument (Fig. 2) is extremely simple: stretch a cord from brass screws fastened either in the timbering of the mine or in wooden bucks provided for that purpose, and read courses as well as vertical angles by suspending the compass and arc respectively from the tightly stretched cord. The co-ordinates to horizontal and vertical angles can be obtained by the other instrument mentioned, namely, the trigonometer. A

plate 15 inches square (Fig. 3), representing a division horizontally and vertically into 100 equal parts, which are again divided into halves, is provided with an arm or alidade, *AB*, which, having the same division as the plate, is fastened with its zero-point of the plate and moves freely around the same. A quadrant divided to quarter-degrees, and having this zero-

NICHOLIA, IDAHO. — Nicholia is a mining camp situated on the head of Burch creek, Lemhi county, Idaho. It is 75 miles from Camas, the nearest point on the railroad line. There are two furnaces, with a capacity of 40 tons, and two more will be put up this spring. There is plenty of ore in sight which runs 30 to 70 per cent lead and 30 ounces in silver per

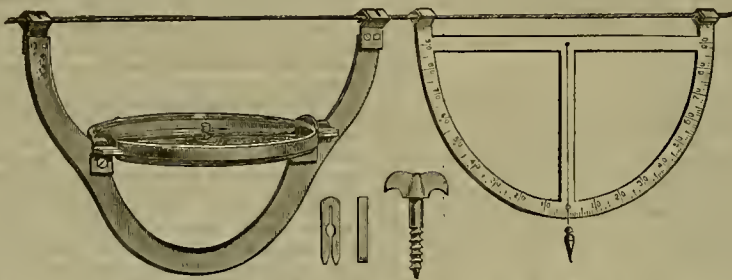


Fig. 1.—HANGING COMPASS AND ARC, WITH CORD-SCREW AND CLAMP.

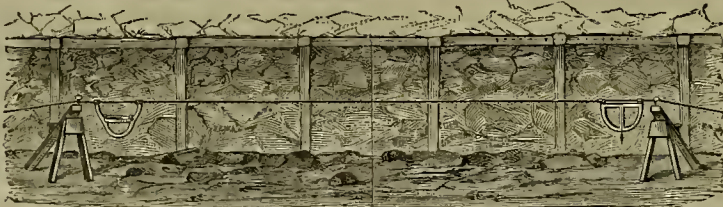


Fig. 2.—METHOD OF USING THE HANGING COMPASS.

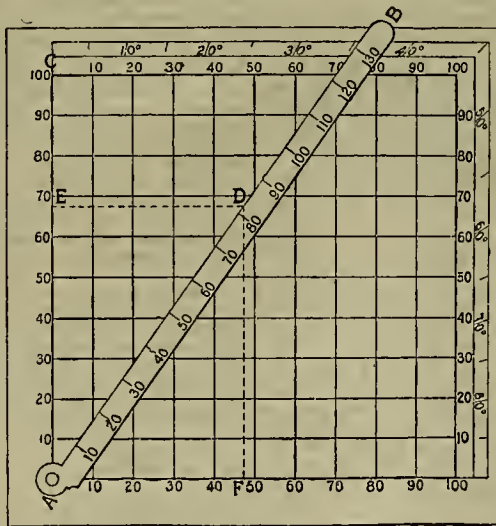


Fig. 3.—THE TRIGONOMETER.

point as a center, is graduated upon the plate. By moving the arm to the given angle, and reading the distance of the respective measurements on the arm, the co-ordinates are immediately obtained on the plate, with sufficient accuracy for the calculation of measurements as obtained by the hanging compass. If, for instance, *BAC* is the given angle, and *AD* the given distance, *DE* and *DF* are the co-ordinates. Again, if *AE* be the radius, and *BAC* the angle of deflection, *DE* is the tangent, and so on, through all the trigonometrical functions. The readings are exact to within 0.1 per cent. A few hours devoted to the instruction of a foreman will enable him, if possessed of ordinary intelligence, to carry out measurements from the base lines established by the engineer, and save the latter much time, labor and inconvenience.

ton. The Spring Mountain prospects are looking well and are shipping ore of good quality to Nicholia. These facts we gain from a subscriber at Nicholia.

A PARTY of surveyors are said to be heading for a connection with the Atlantic and Pacific Railroad at Daggett, San Bernardino county, or Ludlow's, via Resting Springs, Coleman's borax works, and the Soda lake mines. They are very reticent, but many believe them to represent the Utah Southern Railroad.

A CRESTED BUTTE special to the *Republican* says: The shaft-house and concentrator of the Forest Queen mine, at Irwin, was completely destroyed by fire on Saturday night. The loss is \$30,000. No insurance. The fire is supposed to have been caused by an incendiary.

Tailings and Slimes.

In the treatment of tailings from silver ores with that class which is treated raw it is rarely possible to extract such a percentage as to render the tailings worthless, and therefore these are commonly saved and allowed to weather, salt being sometimes used to assist the decomposition. As a rule, however, there is enough salt remaining in the tailings after working the ore to produce the required effect in the course of a year or two. These tailing piles are, when possible, occasionally shoveled over so as to expose new surfaces to the air. It must be remembered that no matter how fine a particle of tailings may be, there can still be a particle of silver in the center of it, so completely enveloped by earthy material that chlorine cannot act upon it or quicksilver touch it. When tailings are treated only that portion of silver is amalgamated which is exposed to contact with the quicksilver. As the outsides of the particles have already been once subjected to the influence of chlorides and quicksilver, the amount of silver which can be recovered by a second amalgamation, of course taking it for granted that the ore was worked properly in the first place, is exceedingly small, except where long-continued grinding is practiced, or where the character of the gangue has been changed by machinery. The percentage extracted for tailings does not often exceed 50 per cent of assay value, and generally falls below this point. With the tailings from roasted ore, which are of lower grade than those from raw working, it is still more difficult to obtain the silver.

Slimes sometimes assay more than the ore itself, sometimes less. The percentage of slimes escaping from wet-crushing mills varies from one to fifteen per cent, according to the character of the ore. Ores containing much iron oxide generally produce the most slime.

Dichloride of Copper for Treating Ores.

A method of making dichloride of copper for treating ores has recently been patented, which consists in treating sulphate of copper in the presence of salt, water and metallic copper, under pressure and with heat. An ordinary metal cylinder is used, with the necessary pipes, cover and openings. In this are the necessary quantities or proportions of metallic copper, the desired salt—as chloride of sodium and a solution of sulphate of copper—that is, water and sulphate of copper. The head is then closed as are the faucets and discharge openings. Steam is then introduced and the mixture subjected to its heat and pressure. The inner surface of the cylinder or tank is lined with lignum vitae or other substance to resist the chemicals.

By the employment of the lining, for which the copper has no affinity, the apparatus is rendered capable of long-continued use, and successive withdrawals and renewals of the mixture may be made, so that a constant supply is furnished. The inventor, Mr. Abel Patchen, of Westfield, N. Y., does not limit himself to any proportions in the ingredients, nor to any particular strength of solution of sulphate of copper, nor to any particular degree of pressure. The product is designated "dichloride of copper," but the inventor does limit his invention by reason of the name, as whatever the product is designated, when produced by this process, it has proved useful in working ores.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Squaw Creek Mines.

EDITORS PRESS:—Knowing how the PRESS devotes itself to promote the interest of mining, and keeps before the outside world the resources of the different camps, I have come to the conclusion that it is the duty of every miner not only to patronize the PRESS, but also to help it, through its columns, in letting the public know that the mining interests are neither dead nor secondary to any in the country. The gold quartz mining of the State is but yet in its infancy, and more good gold quartz ledges are being found to-day and opened up than ever before in the State.

With mining it is like any other business. If you wish it to be known and to prosper, you have got to place it before the public so they can see it, read of it and hear of it, and then they will commence to learn that California not only is great in wheat and fruits, but is equally as great a producer in that which goes not to exchange, but to add to the wealth of the world. A new mining camp that has the ledges and gold to back it does not want to be hushful about it, but let it be known. Write it up and let the journal which devotes itself to that special purpose spread it far and wide, and not place in black and white anything but what we are able to substantiate, so that when the capitalist whose attention it may have attracted comes, or sends his agent to look, he will see chances for good investment for his money, and that his trip is not for nothing. With this idea in view, I thought I would write to your paper and let the public know of a new gold mining camp that is just springing into existence and which is at the present time extracting from terra firma some of the "root of all evil" and sending it forth to be stamped with the bird of liberty and the goddess of justice and add more of the filthy lucre to the world. This new camp is known as "Squaw Creek." The mines were found about a year ago by Mr. J. Conant, and are situated about five miles from Kennet Station, on the line of the California & Oregon Railroad, twenty miles from Redding, in the old gold-producing county of Shasta. Although the camp is only a year old, there has been several good sales made: one of \$35,000 and another of \$15,000, besides various small sales of from \$1000, etc. There has been a road built into the mines, and although not a first-class one, still they have hauled in two mills, one a Gutenberg mill and the other a Huntington, which are running steadily day and night, and have every indication of doing so for years, judging from the piles of ore in sight in the ledges and veins. I will try and describe the district veins and formation in my next.

A. M.

Owners of the Big Bend Tunnel.

A Matter of History Corrected.

EDITORS PRESS:—Referring to the completion of the Big Bend tunnel, in Butte county, California, the *Oroville Mercury* refers to Major Frank McLaughlin as the great "prime mover" in that great enterprise, and states that to his energy and foresight the completion of that undertaking is due. In the interest of correct history, and in simple justice to others, please permit me space in your columns in which to make a few statements to correct the errors into which the *Mercury* has evidently fallen.

From papers now on file and in my possession I find that several old miners had projected this tunnel long before Major McLaughlin had anything to do with it, and were really the prime or original movers in this great enterprise. Subsequently, Mr. Geo. W. Cummings called the attention of Major McLaughlin to the property, and urged him, in letters now in my possession, to try and interest Eastern capitalists therein. But nothing seems to have been accomplished in that direction up to the time when my attention was first called to the property of Dr. W. Allstrom, then of Chicago, by whom I was induced to visit California, and by whose solicitations I purchased a one-fourth interest therein. Major McLaughlin, Colonel J. C. Logan, Dr. W. Allstrom and myself then each owned one-fourth interest in the property.

I then came East and organized the Big Bend Tunnel and Mining Company of this city, and with a friend of mine bought out the interest of Dr. Allstrom, and raised \$20,000 with which to defray the expenses of Major McLaughlin and Colonel Logan to go to Europe and endeavor to negotiate the sale of a portion of the property, in order thereby to raise the necessary funds with which to build the great tunnel. Their trip resulted in a complete failure, and we were thrown back upon our own resources.

Some time later I purchased the entire interest of Col. Logan and at different times for myself and friends, the entire interest of Major McLaughlin, with the exception of 150 shares, which now stand to the Major's credit on the

books of the company. The total capital stock of the company is divided into 200,000 shares. Over four-fifths of all the money to build the Big Bend tunnel has been furnished by me out of my own pocket, and the balance by friends of mine whom I induced to invest their money in this great undertaking. If any honor is due to any one for the building of this great mining work, it hardly seems fair, in view of the foregoing facts, that those who have done all the real work, and furnished all the money, should, on the completion of the tunnel, see another lionized as the "prime mover"—the man to whose "energy" the whole thing is attributed. I feel assured that Major McLaughlin claims no such distinction for himself.

The officers of the company feel that much credit is due Mr. N. A. Harris, our efficient superintendent, for his excellent and economical management of the company's affairs, as well as to Mr. John Cribbins, our tunnel foreman, and to the faithful men under them, for the completion of the tunnel with such remarkable speed.

The following complete list of all the present stockholders of the Big Bend Tunnel and Mining Company, who own 100 shares or more, with the number of shares owned by each, may be interesting and not out of place in substantiation of the foregoing statements. Very respectfully,
R. V. PIERCE,
President Big Bend Tunnel and Mining Co.
Buffalo, N. Y., April 29, 1886.

List of Big Bend Tunnel Stockholders.

Name of Stockholder.	No. of Shares.
R. V. Pierce	163,017
George H. Van Vleck	12,954
Nelson Holland	12,043
James H. DeGraff	3,400
James H. DeGraff (in trust)	
For estate of Thos. Callow, 500 shares	
For P. O. Hundley, 1000 shares	1,500
William S. Wyse	750
S. O. Barnum	500
Mrs. Elise Allstrom	500
Hiram Extein	500
L. H. Crall	320
J. Walter Thompson	300
S. C. Davis	200
James Elverson	200
Mrs. J. W. Thompson	200
James A. Roberts	185
Frank McLaughlin	150
O. C. Davis	150
Mrs. Mary J. Pierce	100
Frank Gifford	100
	197,649
Total small holdings of less than 100 shares to each stockholder	2,351
Total shares	200,000

Hints for Lubricating.

EDITORS PRESS:—It is now known that one-half the power expended in mills and factories is consumed simply in overcoming friction. Such a fact ought to stimulate all owners of machinery to give attention to the purchase of the proper oils for its lubrication.

The trouble on this coast is that the oil bill is so small a part of the annual mill or factory expense that from year to year dangerous and destructive oils are used because they are cheap; or unnecessarily expensive oils are used because they have given no bad results. But large buyers who give the subject attention and take pains to ascertain for what purposes certain oils are useful, and for what others they are useless, annually make a saving in their oil bill that would startle the conceptions of the ordinary buyer.

It is not supposed that the average consumer of oil can take time to make elaborate tests or study coefficients of friction, but it is far cheaper to buy two or three grades of oil, each suitable to certain machinery, than it is to buy one expensive oil simply because it will lubricate everything without annoyance. The writer was recently sent for by a large mill where \$1.25 per gallon had been paid for an oil to lubricate the engine, when 45 cent oil would do the work just as smoothly and economically. Considerable indignation was expressed at the suggestion that the cheaper priced oil would do just as well, nevertheless the 45 cent oil is to-day lubricating that engine with perfect satisfaction.

To-day farmers on this coast enjoy the solitary distinction over farmers everywhere else of buying castor oil at from \$1.50 to \$2 per gallon for field work, when heavy blended petroleum lubricants do the same work at half the expense.

CHARLES J. WOODBURY.

BACK AGAIN.—A man who used to mine around here in 1851 returned the other day and is stopping at the New York hotel. He came back to prospect some rich places he used to know in the long ago. He thought he would find things pretty much as he left them, and in a year or so make a big stake out of the leavings of pioneer days. He is worse than disappointed at what he finds or rather what he fails to find. The mountains and streams seem to have changed with the people, and the ancient landmarks are missing. Things have got all turned around and misplaced, by some means, and the old prospector can't for the life of him tell where the rich claims are that he covered up and left behind him when he went back to the States almost a generation ago.—*Nevada Transcript*.

At Sutro Heights.

On Saturday, May 1st, President Holden, of the University, and a large representation of the faculty and senior class of the institution paid their respects to Adolph Sutro, Esq., at his beautiful residence by the sea, which is very appropriately named Sutro Heights. Mr. Sutro is an enthusiastic patron and promoter of the arts, and the higher branches of learning, and it was very fitting that the working forces of the University should show their respect for him in the manner stated.

Sutro Heights is an estate exceedingly beautiful for situation. As one stands upon the esplanade which Mr. Sutro has carved from the native rock and set about with statues from the home of art beside the Mediterranean, one can but harbor the thought that intellectually, as well as otherwise, the course of empire has really taken its way westward until the placid waters of the Pacific declare its journey done. It certainly is a fitting enterprise to crown a life of great action to undertake, as Mr. Sutro has done, to establish upon the very cliffs of the ocean a retreat clad in the beauties of tree and shrub and flowering plant and enriched by treasures of art and literature gathered from the best sources of the world. It is the wish of all who know his plans that many years may be spared him to complete his work and to enjoy it.

Judged by the aims which Mr. Sutro has to develop and improve his seaside home, his enterprise is little more than begun; but viewing it as a cursory visitor would, it seems already complete and delightful. Certainly during this last few years wonders have been accomplished. Over the sands which pertain to such a littoral situation, there is now a garden of several acres which for thrift and beauty of individual plants and general landscape gardening effects, would put to the blush many a site where the owner has naturally rich soil and natural shelter for his allies. More than this, there is a profusion of statuary art, embodying all modes of human thought from the magnificent winged Apollo which crowns an eminence and the stately Minerva, linking the achievement of intellect with the joys of domestic life, down to the nymphs which nestle in the shade and the tiny grotesques which seem to be gambling on the grass plots. It would be wholly impossible to give any sketch of the richness and variety of the Heights in these regards. One could spend weeks in contemplation of the masterpieces here brought into close association within a stone's throw of the sounding surf of the Pacific.

We have said Mr. Sutro has but begun his work. This is shown by the millions of seedling maritime pines, and Monterey pines and cypresses which he has in his nurseries, not to speak of the wealth of hedging plants in the propagating frames and plant houses. Suggestions of efforts to come are also seen in the huge cases of tiles and slabs and blocks of stone which he has brought from abroad to weave into his structures and outdoor improvements. His spacious residence is overflowing with rare art and bric-a-brac, and down in the city he has large collections of manuscripts and perhaps 100,000 volumes of valuable scientific and literary books—a contribution of inestimable value to intellectual culture on this coast. It is this rich possession which Mr. Sutro proposes to establish on Sutro Heights and thus make it available to eager students. It is his plan to construct a fine building according to his own designs which will contain the library and abundant room and conveniences for those who desire to pursue special studies and investigations.

Naturally this design awakened much interest among the University visitors and their appreciation of Mr. Sutro's valuable plans in this direction was earnestly expressed. President Holden assured Mr. Sutro that the facilities which he was preparing for scholarly work would be regarded with keen interest and the fullest fellow-feeling by the University people, and that the closest relations with his library would be courted, for it would be of inestimable value in many departments of University effort.

But we cannot follow a pleasant and profitable day at Sutro Heights to greater length at this time. Mr. Sutro entertained his guests royally. The visit was certainly a delight to all who joined in making it.

IS THIS CORRECT?—By reason of the collection of ores of many grades in richness and quality and mixing them, to produce the proper fluxes, enables the smelters at Salt Lake City to pay good prices for ore. The present charges for reduction range from \$6 to \$18 per ton, according to character, says the *Tribune*, and the result is that ore comes here from Nevada, where, if milled, would be from \$20 to \$25 per ton, and the mill's only guarantee 80 per cent of the assay value, thus bringing the net yield of \$100 ore down to \$55. Here the smelters deduct only five per cent for loss instead of 20, as the mills do, while the charges are from \$5 to \$10 less. This fact is bringing hundreds of tons of Nevada ore to this city, and the amount is all the time increasing, thus making that State an important field to draw supplies of ore from.

THE tricycle has been adopted for the postal service in Stuttgart, Germany.

New Gold Fields.

E. L. Baker, our Consul-General at Buenos Ayres, has recently reported to the State Department the discovery of gold in Patagonia. According to the report of the commission appointed by the Argentine Republic to examine these deposits they are of superior class; and "there is abundance both of gold and platinum." Mr. Baker says the ore is believed to be richer than that of California or Australia. Not the least interesting fact about this discovery is that the new gold fields are easily accessible. The deposits are said to extend from Cape Virgin, on the northern shore of the straits of Magellan, through which many vessels pass every year, northward along the Atlantic coast for 40 or 50 miles.

Among the mining companies organized last year in London were 14 projected to carry on operations in the gold and diamond fields of South Africa, three companies for Asia, 12 for South America, six for Mexico and Central America and five for Australasia.

Among the mountains and foothills that border the southern and western frontiers of the Transvaal hundreds of miners are developing placer diggings, from which during the closing week of last year 2550 ounces of gold were received at Natal. In the same region an Englishman is now turning out several tons of lead a day. The civil engineer, Anderson, reported 15 months ago that among these same ranges of hills west and northwest of the Transvaal there were rich deposits of gold. He said the natives as yet would not allow the country to be properly prospected, but that if the region were annexed to the British crown there would be no difficulty in developing its resources. This country is included in the great distance over which Great Britain, by treaty with the native chiefs, assumed a protectorate last year.

Still further north, among the many southern affluents of the Zambezi, W. Montagu Kerr recently found rich indications of gold. He brought home from these sandy river beds numerous specimens, generally free from base metals. He says the natives wash the alluvial deposits in wooden trays, and put the gold they extract in large gulls, which they carry great distances to trade for cloth and ornaments. A part of this gold-producing region had never before been visited by a white man, but in another part the Portuguese formerly carried on profitable diggings, though their methods of mining were cumbersome and expensive. It was these mines, together with the ivory trade, that made Tette, far inland on the Zambezi river, at one time a busy and important town.

Prejevalsky, the explorer, is now telling the Russian audiences to whom he is describing his last great journey that "gold is very plentiful throughout Northern Thibet." He says he saw natives mining near the sources of the Hoang Ho river. They dug only one or two feet below the surface, and their methods of washing were of the most primitive description. "Nevertheless," says Prejevalsky, "they showed us whole handfuls of gold in lumps as big as peas, and twice or thrice as big." W. Mesny, who has also visited the diggings of Northern and Eastern Thibet, corroborates Prejevalsky's estimate of their great value. He says he saw gold in nuggets from the size of a pea to that of a hazel nut, almost perfectly pure and perfectly malleable. Prejevalsky expresses the opinion that at a lower depth great treasures will be found on this immensely elevated plateau. The deepest and richest diggings observed by Mr. Mesny were about 16 feet below the surface. In his opinion no metal will be found below the bed of rock on which this surface gold-bearing stratum rests, and in this respect he appears to dissent from the opinion expressed by Prejevalsky.

The discovery of gold two years ago in Manchuria was another of the numerous sources of unpleasantness between Russia and China. As the diggings were only twenty miles from the Russian possessions, a number of Russians joined the Chinese and Koreans who were there washing gold. One feature of the resulting disturbance was a skirmish between Russian and Chinese troops in June last, and then, it is reported, the intruding miners, with Russia's consent, were hustled out of the forbidden territory.

From Madagascar and Honduras reports have been received of new discoveries of gold. An expedition from the Argentine Republic is now supposed to be ascending the Chabut river in Patagonia to see if the reports derived from Indians, that gold is found at its headwaters among the Cordilleras, are true. Many of these regions are still practically closed to white men, and the golden promises of some of them may never be realized. The big nuggets found in Tasmania, a few years ago, caused a rush to her gold fields for a while, but to-day, although the annual gold product of that island amounts to \$1,200,000, only two among 160 mining companies are paying large dividends.—*New York Sun*.

SINGULAR EXPLOSION.—A singular explosion occurred in the hardware store of Rutherford & McPike, at Vallejo, last week, from an empty paint barrel that had remained in the store for several years where the sun shone through a skylight upon it, and it being air-tight, coated on the inside with paint, generated gas, and when it was struck, with the intention of breaking it up, an explosion followed which was heard for blocks round. Fortunately, very little damage was done.

Rural Health Retreat.

MESSRS. EDITORS:—Having spent about three months at this health resort, I would like, with your consent, to say a few words to the public concerning it. Perhaps I may be able to assist some health-seeker in finding the home and health he needs. I am the more inclined to do this from the fact that the place is little known. It is not included in the catalogue of numerous pleasure resorts and sanitary watering places in the State in the San Francisco Hotel Gazette. Then the proprietors seem rather shy about tooting their own horn. The hen cackles over her newly laid egg; the stump orators and statesmen speak to the reporters; preachers advertise the topics of their sermons, especially when they think they have a bit of something good. Why should the doctors and hygienic philanthropists hide their light under a bushel?

The institution known as the Rural Health Retreat was first founded in a private enterprise by W. A. Pratt, A. B. Atwood and M. G. Kellogg, and chiefly intended as a pleasure resort and restful retreat, but not proving a remunerative investment, was subsequently transferred to a corporation composed of leading Adventist brethren, and has ever since been recognized as an adjunct of the general cause. It is run pretty much on the same plan of the celebrated Battle Creek, Mich., sanitarium. The brethren of this society have evidently been very liberal in their contribution to this worthy enterprise. The present officers are: J. N. Loughborough, President. The Board of Directors comprise the following well-known persons: M. A. Pratt, J. N. Loughborough, J. D. Price, J. H. Waggoner, M. C. White, A. B. Atwood and Wm. Ings.

Ex-Senator Matt Carpenter, on taking a drive over Chicago and surroundings, exclaimed, "Surely the Lord meant business when he made this country." This excellent institution is evidently located along one of the divine parallels of health and beauty. It is situated on the southwestern slope of the Napa mountains, about two miles north of the bustling village of St. Helena, in Napa county, California. It is about 1200 feet above the level of the sea, quite above the range of the fog currents. The air is pure and bracing and has proved to be a specific for malaria, catarrhal affections and troubles of the throat and lungs. The Crystal springs, a few steps above the Retreat, furnish an abundant supply of the purest, soft water. Many eminent medical men have pronounced the water from these springs far superior to any other for the purpose of life and health. There is no superior winter resort for invalids in the land. Here the verberna, geranium, and a great variety of other flowers bloom in the open air during the winter months. As a summer resort it is especially inviting to invalids as the variation of temperature is considered as favorable as at any other locality in California. And then one never tires gazing at the picturesque landscape from the piazza of the Retreat. Emerson says Nature gets up such magnificent sunsets because she has been so long trying. She must have been in an unusually happy mood when she shaped these hills and dales. Below is the Napa valley dotted with orchards, vineyards, gardens and homes that have an air of thrift, plenty and content. On the opposite side of the valley looms up the Sonoma range of mountains, covered with vineyards, interspersed with oak groves, clumps of the scrubby manzanita, the madrona, crowned with pine and fir.

The curve of this range shelters the Retreat from the chill, raw atmosphere of the coast and breaks the force of the winds. To the north may be seen the famous Mt. St. Helena, standing as a grim sentinel at the head of the valley, with its volcanic-scarred head often hidden among the clouds. The mountains in the immediate vicinity of the Retreat are clothed with evergreen shrub trees and an endless variety of wild flowers that fill the air with their sweet fragrance. These hills and slopes furnish delightful walks and rambling grounds. So charming and varied is the scenery and bracing the air that invalids are often tempted into over-doing.

The medical board consists of Drs. J. S. Gibbs and W. P. Burke. These gentlemen are amply equipped for their work both by education and experience. Their success is simply marvelous when we remember that their pa-

tients are mostly chronic cases that come here as the last chance. During our long sojourn we never knew one leave this infirmary that was not thoroughly cured or greatly improved. Hot and cold baths of every description are given, together with an intelligent use of electricity, faradio and galvanic, Swedish movement, massage and the vacuum treatment. Special attention is given by these medical attendants to all available hygienic agencies for the recovery of the sick. While not cranky vegetarians and Grahamites, they eliminate from the table as hurtful many dishes that are in ordinary use. The meat into which the devil went and out of which there is no proof they ever came is held in especial disfavor.

One of the first things the visitor notices on coming here is the air of sociability that pervades the place. In an hour's time he feels perfectly at home. He finds no one afflicted with homesickness. The affable superintendent, J. D. Rice, the ever watchful and sympathetic matron, Mrs. J. S. Ings, the vigilant doctors, and indeed, all the officials and helpers seem to vie with each other in making the sojourn of the invalid pleasant and comfortable. And this is not the studied and artificial politeness of hotel officials and waiters, but is something akin to the spontaneity of humanity. But what is still better, the Retreat is in the hands of men who revere God and devoutly prize the principles of morality and religion. One cannot help feeling that he is in a pure moral atmosphere, that it is spiritually healthful, and that he can recommend to his friends to send wife or daughter here without fear that their sensibilities will be shocked by ribald jokes, bad manners and exhibitions of intemperance and profanity.

The original building has recently been thoroughly refitted, and an extensive addition is nearly complete. The snug cottages are admirably adapted to the use of families. The croquet ground, swings, swinging chairs, hammocks, rustic seats and benches under the shade trees, all add to the health, enjoyment and pleasure of the invalids and other boarders. The terms for board, room and treatment are very reasonable. If these lines should be the means of leading any health-seeker to this resort, he will never regret it; and the writer, who has no interest whatever in this institution—only goodwill for a noble cause—will feel that he has at least cast one crumb of bread upon the waters. W. W. McK.

Quartzite Ore Deposits.

A great many persons consider the ore bodies in the quartzite at Red Cliff an anomaly in ore deposits. While the occurrence of ore in quartzites is rather unusual, Eagle River quartzites are not the only ones so far discovered, that have proved profitably productive. The Old Man, and other mines in the neighborhood of Camp Fleming, near Silver City, New Mexico, are analogous. Both are secondary depositions of silver formerly contained in a vein situated between the overlying limestone and superincumbent porphyry. The mineral in the Red Cliff quartzite was unquestionably liberated from the limestone-porphry contact, which at one time extended across the Eagle River canyon, and well up on Girard mountain, possibly to the foot of the Mount of the Holy Cross. All this area to the southward of the canyon now presents the appearance of a great tilted meadow, the carboniferous limestone and overlying eruptive rocks having all been scored away, down to the adamant quartzites, which interrupted the course of disintegration and erosion. The area denuded here, and which unquestionably contained a productive mineral zone, is greater than the present producing area of the Leadville district, and hundreds of millions of dollars worth of silver, lead and gold were carried down the Eagle River valley. During the earliest portion of this period, which was prior to the scoring of the Eagle River canyon, the channels and caves on Battle mountain, now so productive, were formed. When the wearing away of the rock on Girard mountain reached the plane of contact the ore was liberated and a small percentage of it was carried by waters, either in suspension or solution, and precipitated in the previously formed cavities in the quartzite. The openings in which the ore is found all contain smooth, polished walls, devoid of angles, and disclose other evidences proving that they are of water formation. The mineral generally consists of an impalpable clay, such as might be found in the bottom of a vessel occupied for some time by muddy water.

The continuance of the quartzite deposits is largely a matter of speculation. So far some of the mines have been opened to a depth along the mineral bearing plane of 600 to 800 feet. The ore channels may continue to produce for

five times this distance, but their character would scarcely warrant this supposition.

The quartzites of New Mexico, carrying silver differ slightly from those of Red Cliff. In the New Mexican quartzites the silver was deposited from percolating waters. The physical conditions of the surrounding country are, however, almost identical. Just above the quartzite ledge is a high, gently sloping mountain, from which this rock has all been eroded down a stream of limestone, which at one time served as the bedding plane for a great ore deposit. With the erosion of this ore body, a portion of its silver contents was taken up in solution, and subsequently deposited in the porous quartzite below, by infiltration. To such an extent was the quartzite impregnated with silver in places that one could stand off at a distance and throw a knife, striking the point firmly in the precious metal.

These two features engender a new field for the search of local deposits of ore in the quartzite. The associations and surroundings of the deposits above described will prove valuable in indicating points at which repetitions may reasonably be looked for. They go to prove that such deposits exist only in quartzites that have formed a barrier or dam across a current from a previously existing ore body. This rule, we believe, will hold good to many other ore deposits in quartzite, besides those so far reported.—*Leadville Herald-Democrat.*

Aluminium.

The Properties of the Metal.

An interesting address has been delivered before the Scranton Board of Trade, Pennsylvania, by the president (Mr. J. A. Price), who, after graphically describing the many valuable attributes of iron and its varied uses, says:

However axiomatic may be everything that can be said of this wonderful metal, it is undoubtedly certain that it must give way to a metal that has still greater proportions and vaster possibilities. Strange and startling as may seem the assertion, yet I believe it nevertheless true that we are approaching the period, if not already standing upon the threshold of the day, when the magical element will be rapidly supplanted, and when this valuable mineral will be as completely superseded as the stone of the aborigines. With all its apparent potency it has evident weaknesses; moisture is everywhere at war with it, gases and temperature destroy its fiber and its life. Continued blows or motion crystallize and rob it of its strength, and acids will destroy it in a night. If it be possible to eliminate all, or even one or more of these qualities of weakness in any metal, still preserving both quantity and quality, that metal will be the metal of the future.

The coming metal, then, to which our reference is made is aluminium, the most abundant metal in the earth's crust. Of all substances oxygen is the most abundant, constituting about one-half; after oxygen comes silicon, constituting about one-fourth, with aluminium third in all the list of substances of the composition. Leaving out of consideration the constituents of the earth's center, whether they be molten or gaseous, more or less dense, as the case may be as we approach it, and confining ourselves to the only practical phase of the subject—the crust, we find that aluminium is beyond question the most abundant and most useful of all metallic substances. It is the metallic base of mica, feldspar, slate and clay." Professor Dana says: "Nearly all the rocks, except limestones and sandstones, are literally ore beds of the metal aluminium." It appears in the gem, assuming a blue in the sapphire, green in the emerald, yellow in the topaz, red in the ruby, brown in the emery, and so on to the white, grey, blue and black of the slates and clays. It has been dubbed "clay metal," and "silver made from clay," also when mixed with any considerable quantity of carbon becoming greyish or bluish black "alum slate." The metal in color is white, and next in luster to silver. It has never been found in a pure state, but is known to

Exist in Combination

With nearly 200 different minerals. Corundum and pure emery are ores that are very rich in aluminium, containing about 54 per cent. The specific gravity is but two and a half times that of water. It is lighter than that of glass, or as light as chalk, being only one-third the weight of iron, and one-fourth the weight of silver. It is malleable as gold, tenacious as iron, and harder than steel, being next the diamond. Thus, it is capable of the widest variety of uses, being soft when ductility, fibrous when tenacity, and crystalline when hardness is required. Its variety of transformations is something wonderful. Meeting iron, or even iron at its best in the form of steel, in the same field it easily vanquishes it at every point. It melts at 1300° F., or at least 600° below the melting point of iron, and neither oxidizes in the atmosphere nor tarnishes in contact with gases. The enumeration of the properties of aluminium is as enchanting as the scenes of a fairy tale. After giving a brief sketch of its birth and development, Mr. Price says: "It was reserved to the distinguished German, Wohler, in 1827, to complete the work of the past 50 years of struggle, and finally produce the minute fine white globule of the pure metal from a mixture of the chloride of aluminium and sodium, and at last the secret is revealed—the first step was taken.

It took 20 years of labor to resolve the mere discovery into the production of this aluminium bead in 1846, and yet with this first step this new wonder remained a fetus undeveloped in the womb of the laboratory for years to come.

Returning again to France some time during the years between 1854 and 1858, and under the patronage of Emperor Napoleon III., we behold Davy as last forcing nature to yield and give up this precious quality as a manufactured product. Rose of Berlin and Gerhard of England, pressing hard upon the heels of the Frenchman, make permanent the new product in the market at £6 8s. per pound. The despair of three-quarters of a century of toilsome pursuit has been broken and the future of the metal has been established.

The Art of Obtaining the Metal

Since the period under consideration has progressed steadily by one process after another, constantly increasing in powers of productivity, and reducing the cost. These are intensely interesting to the student, but must be denied more than a reference at this time. The price of the metal may be said to have come within the reach of the manufacturing arts already. A present glance at the uses and possibilities of this wonderful metal, its application and its varying quality, may not be out of place. Its alloys are very numerous and always satisfactory; with iron producing a comparative rust proof, with copper the beautiful golden bronze, and so on, embracing the entire list of articles of usefulness, as well as works of art, jewelry and scientific instruments.

Its Capacity to Resist Oxidization

Or rust fits it most eminently for all household and cooking utensils, whilst its color transforms the dark-visaged disagreeable array of pots, pans, and kitchen implements into things of comparative beauty. As a metal it surpasses copper, brass and tin in being tasteless and odorless, besides being stronger than either. It has, as we have seen, bulk without weight, and, consequently, may be available in construction of furniture and house fittings, as well as in the multitudinous requirements of architecture. The building art will experience a rapid and radical change when this material enters as a component material, for there will be possibilities such as are now undreamt of in the erection of homes, public buildings, memorial structures, etc., for in this metal we have the strength, durability and the color to give all the variety that genius may dictate. And when we take a still further survey of the vast field that is opening before us, we find in the strength without size a most desirable assistant in all the avenues of locomotion. It is the ideal metal for railway traffic, carriages and wagons. The steamships of the ocean will increase their speed and carrying capacity. A thinner as well as a lighter plate; a smaller as well as a stronger engine; a larger as well as a less hazardous propeller; and a natural condition of resistance to the action of the elements, will make travel by water a forcible rival to the speed attained upon land, and bring all the distant countries in contact with our civilization, to the benefit of all. This metal is destined to annihilate space even beyond the dream of the philosopher or poet.

The Tenelle Strength

Of the material is something equally wonderful. When wire-drawn it reaches as high as 128,000 pounds, and under other conditions reaches nearly, if not quite, 100,000 pounds to the square inch. The requirements of the British and German governments in the best wrought steel guns reach only a standard of 70,000 pounds to the square inch. Bridges may be constructed that shall be lighter than wooden ones, and of greater strength than wrought steel, and entirely free from corrosion. The time is not distant when the modern wonder of the Brooklyn Span will seem a toy.

It may also be noted that

This Metal Affords wide Development

In plumbing material, in piping, and will render possible the almost indefinite extension of the coming feature of communication and exchange—the pneumatic tube. The resistance to corrosion evidently fits this metal for railway sleepers to take the place of the decaying wooden ties. In this metal the sleepers may be made as soft and yielding as lead, while the rail may be harder and tougher than steel, thus at once forming the necessary cushion and the avoidance of jar and noise, at the same time contributing to additional security in virtue of a stronger rail.

In conductivity this metal is only exceeded by copper, having many times that of iron. Thus in telegraphy there are renewed prospects in the supplanting of galvanized iron wire—lightness, strength and durability. When applied to the generation of steam this material will enable us to carry higher pressure at a reduced cost and increased safety, as this will be accomplished by the thinner plate, the greater conductivity of heat and the better fiber.

It is said that some of its alloys are without a rival as antifriction metal, and having hardness and toughness fits it remarkably for bearings and journals. Herein a vast possibility in the mechanic art lies dormant; the size of the machine may be reduced, the speed and power increased, realizing the conception of two things better done than one before. It is one of man's creative acts.

The second oil well at Puente is a success at a depth of 300 feet. A fine body of oil is produced, of rather heavy quality, like that from the other well, but excellent for fuel purposes.



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SAN FRANCISCO:

Saturday Morning, May 15, 1886.

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See Advertising Columns.

Passing Events.

The demonstration of the Federated Trades took place in this city on Tuesday, the main feature being a torchlight procession in which all the trades unions and mechanics' associations of the city took part. The procession was one of the largest ever seen in San Francisco, and all the proceedings were orderly and quiet.

There seems to be a tendency among mill men at present to look more carefully into the merits of rotary crushers and pulverizers than formerly, when most of them would look at nothing but a stamp mill. Some of the rotary pulverizers have been very successful in our mining regions, and new candidates for public favor are coming forward.

It is reported that many men are going to the Yukon gold fields, Alaska, and also that the Indians object somewhat to the invasion of their ground.

Mining in this State this year promises to be prosperous as many new quartz mines are being opened and old ones are being more rapidly developed.

PLACER mines in the gulches west of Tuscarora, Nev., are penning out well.

Labor in Mines.

A great industry like that of mining is of peculiar benefit to the laboring classes, giving as it does employment to such large numbers of men. The capitalists who go into mining operations, hold a large plant and open up a mine, must perforce employ many men to carry on the undertaking whether it is profitable or not. The capitalist must take his chances on the investment, but the working miner gets his money whether any is made or not, and it is not only those directly employed at the mine and works who are benefited, but twice as many more persons are indirectly gainers by mining work. The wants of the men must be supplied, and other workers supply them, so that every little camp on the coast contributes to the support of more or less people.

It was found in this State, when hydraulic mining was stopped, that it was not only the employees of the companies enjoined who suffered but the community surrounding the mines lost their patrons and felt the depression also. Many were skilled in no other business and were forced to take up new occupations to gain a livelihood.

Even in a camp which is not in "bonanza," or is in a depressed condition, the large amounts of money must be expended for labor in prospecting, etc. As an instance of this may be cited the Comstock region, in Nevada, where the pay-rolls for labor last month footed up as follows:

Con. California and Virginia.....	\$26,532 00
Oould and Curry.....	2,724 00
Hale and Norcross and Savage.....	8,218 00
Mexican.....	633 00
Ophir.....	4,761 00
Sierra Nevada.....	3,870 00
Union Consolidated.....	1,042 00
Union shaft.....	290 00
Belcher.....	2,500 00
Chollar and Combination shaft.....	13,096 00
Crown Point.....	17,807 00
Justice.....	15,161 00
Kentuck.....	3,500 00
Six-mile Canyon pay-rolls.....	9,000 00
Osbiston shaft.....	15,300 00
Yellow Jacket.....	7,207 00
Overman.....	16,423 00
Total.....	4,500 00

\$150,404 00

The pay-rolls of mills engaged in crushing Comstock ore will swell the total sum disbursed to employees during the month of April to \$215,000.

This is only for one month end none of these mines are now paying dividends. Many of them are producing amounts which anywhere else would be considered large, but the product is more than absorbed by the labor and other expenses incurred in the deep mining carried on.

Artesian Well Records.

People are boring artesian wells all over the country, so that the importance of keeping a careful record of the strata encountered in the progress of drilling needs emphasis, both on account of its practical and scientific value. The record should embrace not only accurate measurements of the successive strata traversed, accompanied by careful notes on their character and a full set of samples, but also a full record of all features relating to their water-bearing nature. Some of these that seem trivial often have much significance when critically examined and expertly interpreted. When the diamond drill is used the cores can of course be kept and preserved in their natural order.

The importance of knowing precisely where to locate the permanent packing is apparent. Economy dictates that it should be placed as near the surface as prudent, not only to save the cost of pipe, but also the reduction in the size of the bore caused by the insertion of the pipe, and the consequent increase of friction. At the same time it is important to cut off all dangerous lateral leakage and forestall an early decline in the flow of the well. An accurate knowledge of the strata penetrated is the only trustworthy means of doing this.

Again, when any defect in the first tubing and packing develops itself, a careful record is a valuable aid in detecting the nature and cause of the defect and determining the means for its correction. The original driller may have thought his general observation and memory a sufficient guide for the first adjustment, but if years have passed neither the driller nor his memory may be within available reach. The party contracting for the sinking of a well should invariably insist upon an accurate written record, which should be preserved and transmitted with the property. The authorities of civic corporations superintending

public wells should place such records on file among official documents. Such records are also of scientific value, not only as guides in the antecedent study of proposed wells, but as direct and positive knowledge of the geological column and many subsidiary phenomena.

California Redwood.

The redwood forests of this State are now becoming very valuable, and, notwithstanding this great waste which has gone on for years, there are still immense tracts of these valuable trees. The wood is most excellent for building purposes and has been used for buildings all over the coast. Letely a market has been found for the wood in the East, where it is used for interior decorating a purposes, this color and grain being much admired. We do not see much unpainted redwood in this State, but elsewhere it is highly appreciated. Shelled and varnished it is very beautiful, but oil should never be put on it, as it turns black under such treatment. Bookcases, sideboards and ornamental furniture can be made of it, though such things must be made to order, the manufacturers generally ignoring this wood for such purposes here, on account of its softness.

The California redwood is highly thought of outside of this State. Vessels going to the islands of the Pacific always carry large deck-loads, the planks being as good as gold in the South seas. It is also being shipped to England and there used as a decorative or "fancy wood." When the costly English steam yacht of Sir Thomas Hesketh, the "Lancashire Witch" was in this harbor a few years since, yachtsmen who boarded her were surprised to find her elegant cabins, etc., all furnished in California redwood and "Oregon" pine. It was considered a choice wood and the finish given it by the English workmen made it have a very handsome effect.

The foreign shipments of this wood are now increasing very rapidly. From Humboldt bay alone during the past year they shipped 7,670,000 feet of redwood lumber, as well as quantities of ehingles and moldings, the value of which was \$180,000. These cargoes went to Honolulu, Sydney, Callao, British Columbia, Mexico, Valpareiso, etc.; most of them went to Sydney.

The California redwood trade in 1885 amounted to 113,000,000 feet, and the consumption was 105,200,000. The redwood belt of this State is about 30 miles wide and 400 miles long, running from Monterey bay to Crescent City. It is all on the western slope of the Coast Range. The wood is very durable and is well adapted for ties and posts. For shingles and shakes there is no better wood. It contains little or no resin and burns slowly. The curled redwood, when polished and varnished, is handsome than rosewood. The lumber dealers estimate there is still standing upwards of twenty-six billion feet of this lumber in this State.

THE WABING PULVERATOR, which we recently described in the PRESS, was awarded the highest medal of its class at the exhibition of the Franklin Institute last year. The dry pulverator has recently been in successful operation and is said to give a very perfect product. The dust chamber arrangement and the form of lubrication for the pins of pushing rollers in the dry pulverator are peculiar and we shall shortly describe them in more detail.

W. A. SKIDMORE, for a long time secretary of the Miners' Association of California, and well-known to the mining community of this coast, is very seriously ill at his residence in this city. Mr. Skidmore is the author of a work on mining law, and has been a contributor to the Mint Director's Report for many years, having previously also filled the position of California agent to the U. S. Mining Commissioner.

THOMAS W. DRESSER, a brick-mason and pioneer resident of San Jose, who committed suicide in that city last week while partially insane, was an old inventor. He perfected a number of inventions in the line of quicksilver furnaces, at the time so many quicksilver mines were being worked in this State.

THE Paradise Valley Mining Company employs eighty-seven men.

Manganese.

Manganese ore is known to exist in several localities in this State, and it was formerly mined here to some extent. The deposit on Red Rock, in San Francisco bay, was worked for a while, but within the past three years nothing has been done with any of the California manganese mines. The high rates of freight necessary to market the product have prohibited the development of the mine. This production of manganese in the United States last year was, in tons of 2240 pounds, as follows:

Manganese ores—	No. Tons.	Av. Value per ton.	Total Value.
Virginia.....	18,745	\$9.01	\$168,942
Georgia.....	2,580	5.19	13,390
Arkansas.....	1,453	4.00	5,832
All other States.....	450	4.38	2,017
Total Manganese ores.....	23,268	\$8.18	\$190,281
Manganiferous iron ores—			
Virginia.....	3,237	\$5.35	\$17,318
Total Manganese and Manganiferous iron ores.....	26,505	\$7.33	\$207,599
Argentiferous Manganese ores			
Montana.....	4,263	\$10.00	\$42,630

This table was compiled by Jos. D. Weeks, an agent of the U. S. Geological Survey, who publishes in advance an abstract of this article in Williams' report. In the table under this head of manganese ores, are included those ores that contain the equivalent of 70 per cent of binoxide or 44.25 per cent of metallic manganese. This is the standard of manganese required by the English chemical works. All ores containing less than this are in this report regarded as manganiferous iron ores, though some of them approaching the standard are used in the manufacture of ferro, and all are used for their manganese. The argentiferous manganese ores are only used for their contents of silver, the manganese, however, serving a useful purpose as a flux.

In the following table is an estimate of the production of manganese ores—that is, those ores containing over 44.25 per cent of metallic manganese—in the United States since 1880. This table is to be regarded only as an approximation, though doubtless a very close one:

Production of Manganese Ores in the United States, 1880-1885.

	1880.	1881.	1882.	1883.	1884.	1885.
Virginia.....	3,661	3,295	2,982	5,355	8,950	18,745
Georgia.....	1,800	1,200	1,000	.....	.....	2,580
Arkansas.....	100	175	400	800	1,453	1,453
Other States.....	300	300	375	400	400	450
Total.....	5,761	4,895	4,532	6,155	10,150	23,268

The production of epiegel end ferro manganese in the United States in 1885 was 30,955 long tons, as compared with 30,262 tons in 1884. Assuming 40 per cent manganese as the dividing line between spiegel and ferro-manganese and that all the ferro-manganese made in the United States was made at the Edgar Thomson Steel Works, the production of spiegel in 1885 would be 23,737 tons, and of ferro 7218 tons.

Mining Accidents.

On Monday last Daniel Donahue, a miner working in the Mendenhall chrome mine, near Livermore, Alameda county, was killed by a cave in the mine. These deposits of chrome are opened by small rudely constructed tunnels. The deposits are seldom extensive, and as soon as one is worked out a new tunnel is run for other deposits. Two other miners were slightly injured by the same cave that killed Donahue.

Ward Wells, a carman was killed by a cave in what is known as the blacksmith's tunnel, in the upper levels of the Parker mine, Wood River, last week.

An accident occurred last week in the Lexington mine, at Butte, in which John J. Lynch and David McHyland lost their lives. The unfortunate men went to work in the morning in a cross-cut on the 800 foot level, and they were not seen alive afterward. At 3 P. M., when the shift went to relieve them, both men were found lying dead, and it required but a glance to ascertain that they were killed by an explosion of giant powder. How the explosion occurred must forever remain a mystery, as the two men were isolated when it happened. The most plausible theory, however, is that the men placed a charge of powder which was slow to explode, and that when they returned to examine it the fire reached the powder, the discharge of the blast immediately followed, with such fearful results.

THE Society of California Pioneers have taken formal possession of their new building.

Working Gold-Bearing Sulphurets.

Concentration and Chlorination in Nevada County, Cal.

(Written for Press by C. A. SCHENCK.)

Concentration and subsequent chlorination of gold quartz, carrying, besides free gold, gold-bearing sulphurets and silver ores, which cannot be amalgamated in the battery, is becoming daily of more importance in California, and the financial success of many miners is now and will be only secured by adopting proper means and processes for concentrating the ore and extracting from the concentrates the valuable metals. Considering, therefore, the growth of the quartz-mining industry, which has received of late a new impetus, it may not be amiss if a description of concentration and chlorination, as they are practiced in Nevada county, with especial reference to the Providence mill, is given to the mining public.

The Ore of the Providence Mine

Comes from a fissure, a so-called contact vein, which extends along the dividing line between a belt of slate and a mass of granite, which latter contains, besides its usual constituents, well-developed hornblende crystals, becoming thereby syenitic in character. The solid and lustrous ore-bearing quartz is intersected by seams of chlorite, and contains besides free gold, from five to seven per cent of sulphurets, mainly pyrites with smaller quantities of galena, chalcopryite, arsenopyrite and zincblende. The ore is brought to the mill on a short tramway, where it is dumped into the grizzlies; the fine dirt falls through the bars of the grizzly into an ore bin, while the coarser rock passing over is delivered to two rock-breakers, and falls from these directly into the same bin that holds the fine dirt. Coarse pieces of nearly pure sulphurets, which do not fall through the bars of the grizzlies, are picked out in feeding the rock-breaker and thrown aside for separate treatment. From the ore bin the ore falls through chutes into self-feeders, and is delivered by them to the 40-stamps, divided into eight batteries. From 90 to 100 tons are crushed in 24 hours; water and mercury are fed from the self-feeder side, the latter once every hour, and in changing quantities, as the state of the amalgam on plates may advise; if this is hard, more mercury ought to be charged, and less if it is getting soft. The plates are cleaned every morning, during which time the battery is hung up; amalgam and mercury are (by hand) washed out of the sands obtained in this cleanup; the sands, being not yet exhausted, are then delivered to a grinding pan for further treatment. Through a No. 6 punched screen, which is equivalent in fineness to a 30-mesh sieve, the pulp flows from the battery over the plates, where the amalgam and quicksilver are caught. The amalgam which collects in the battery is cleaned up every four or five weeks, when a sufficient amount has been deposited and repairs make this cleanup convenient.

The First Set of Plates

Which receives the pulp from the battery is of the same width as the mortar by a length of four feet and a fall of $1\frac{1}{2}$ inch to the foot. From there the pulp is delivered to two 16-inch sluices with a grade of 15-16 inch to the foot. They are all covered with silvered copper plates. Immediately after the cleanup of every morning mercury from a small bottle is scattered over the plates, and by means of a rag or a hand-broom uniformly spread out on their surface.

From these sluices the pulp, out of which free gold has been extracted, flows through a launder, with an inclination of seven-eighths of an inch per foot, to the Frue concentrators.

In accordance with one of the first principles in concentration that each particle obtained in the crushing should escape instantly when crushed to the required size, the stamps are run with a high speed (90 to 96 drops per minute) and low discharge, so that but very little slime is formed, and the pulp yet fine enough for an effectual release of the free gold and the subsequent work on the concentrators. The water required in the battery is also regulated with care and with a special regard to concentration, so that just enough water is fed to carry the pulp out of the battery and keep the plates clean from sand, a diluted pulp being not favored at all for the

Work on the Concentrators.

The 16 Frue concentrators are put up in two

parallel rows in a capacious well lighted room, eight in each row and standing head to head. For convenience they are numbered from 1 to 16, all the uneven numbered in one row and the even in the other. One pair of machines receive the pulp from one battery. For instance, No. 1 and 2 from battery 1, by means of a launder overhead, which is connected with the ore spreader by a perpendicular piece of rubber hose $1\frac{1}{2}$ inch in diameter. In front of the little blocks which assist in distributing the pulp uniformly over the ore spreader is an amalgamating plate of corresponding size, to catch the last traces of amalgam and mercury which might escape from the interstices between the blocks. The cleanup of all the ore spreaders after a run from six to nine months is not inconsiderable. The ore spreader is slightly inclined towards the head of the concentrator, to insure a rapid and uniform discharge from its surface, but is perfectly level in a horizontal line which is vertical to the direction of this inclination.

The pulp, deposited on the traveling belt and flowing down towards the lower end, takes also part in the uphill travel and the lateral shaking motion. In this agitated condition, whereby every particle is more or less sus-

Foundry Notes.

There is on exhibition, and in daily operation, at the Pacific Iron Works, on First St., in this city, a Frisbee-Lucop mill for crushing quartz, the first that has been brought to this coast. These mills have been used in the East for some time, pulverizing phosphates, but are well adapted for quartz. Is a centrifugal roller mill of peculiar construction, in which the rollers revolve on their axis and are carried around in a vertical plane on the inner periphery of a heavy ring of hard iron or steel, set vertically inside of a suitable casing, against which they exert a centrifugal force of 1800 to 2000 pounds each, according to their speed.

The Fulton Iron Works are building Tustin's ore pulverizers, which have been very successful lately at the Oro Plata mine, Murphy's, Calaveras county. The mills have been competing with stamps and have shown great efficiency since they have been put at wet crushing.

The Union Iron Works, of Los Angeles, will furnish the iron-work for the new jail of that city.

The frame of a very large building has been put up on the northwest corner of Brannan and

Drift Mining Operations.

We had a conversation this week with Mr. J. B. Sellier, of Placer county, who owns some drift mining property on the Forest Hill "Divide." The rich mines worked near Forest Hill gave to that place such importance that it imparted its name to the entire ridge between the North and Middle forks of the American river, commonly known as the "Forest Hill Divide." There are many old mining hamlets in this section, which has been yielding largely for many years, as along the rivers that bound the divide the mines have been the richest ever found in the State.

Of late this section has been looking up prosperously again, and many mines are being worked on the gravel channel. A French syndicate has possession of a large extent of ground from Indian Springs down, and only this week the engineers left for the divide to locate a tunnel and commence work. The undertaking is to be a very extensive one. The report on the region was made by C. F. Hoffmann and Ross E. Browne, and these gentlemen have gone up to start the work.

In order that the reader may properly understand something about the region in question, we reproduce a small map which we gave about a year ago, with a general sketch of the divide.

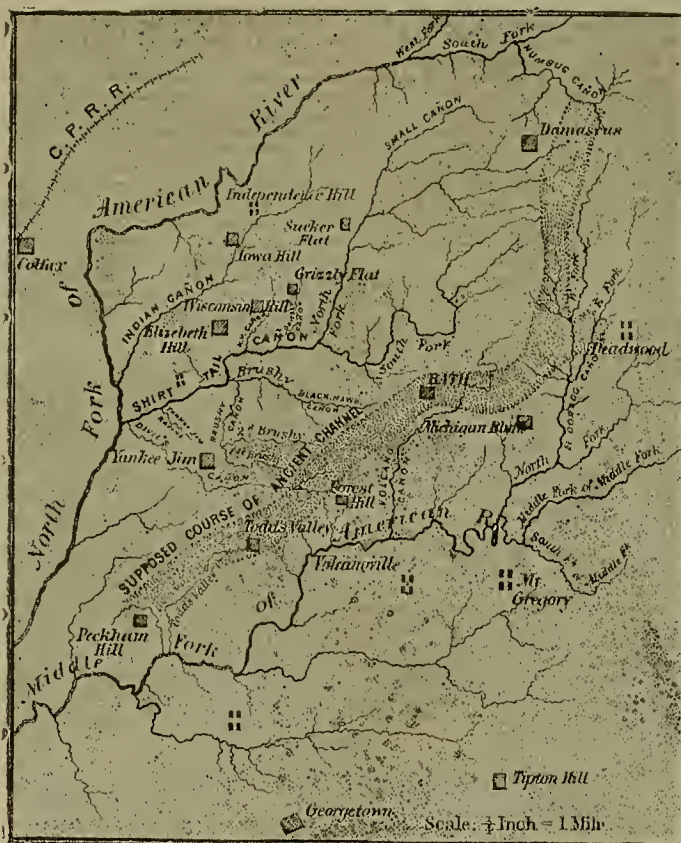
Mr. Sellier informs us of a big strike in the Hazard mine. This mine is not shown on the map, but is on the main channel about $1\frac{1}{2}$ miles from Michigan Bluff. They have a shaft 120 feet deep, and a 3000-foot tunnel from this. The new strike is at the end of the tunnel. They are on the same gravel channel as the well-known Mayflower mine, which has proven so rich. This is the third time the Hazard has been worked. They have run out of means and then stopped, afterwards starting again, but this time they have struck it. The gravel will pay from \$8 to \$10 per carload. The Mayflower is also in rich pay—richer than ever. The mine is in the main channel shown in the map, between the words "Forest Hill" and "Ancient channel," about three miles in a direct line below the Hazard. They crush the gravel from the Mayflower in a mill; the Hazard has no mill yet.

In the Dam claim, which is located about two miles above Sunny South, above the Hidden Treasure, lying east of the old Mountain Gate, Damascus, they have struck gravel worth \$5 per carload recently and are doing well. The Dam claim is not shown on the map but is in the channel represented by the dotted lines, above Damascus and where Humboldt canyon is shown. The claim has been worked a long time and pretty steadily. The tunnel is in a mile. They have no mill, though better results could be obtained by crushing the gravel. They work now by taking out the gravel, washing it, "slacking" the tailings and washing them again. The tailings in some places are left six months or more to "slack."

Mr. Sellier says there is still a big tract of country in this region which has never been worked. He is confident that many river claims will now be opened. The operations of the French company will do much to develop that part of the country and attract attention to it. From Turkey Hill, which is between Deadwood and Michigan Bluff, up to Damascus, the only work done on the channel has been in the character of prospecting. Mr. Sellier says that our map is perfectly correct in showing the course of the ancient channel in which the mines are being worked.

All these mines are worked by drifting, and work can be carried on all the year round. There is no trouble about tailings. In some places the tailings have been worked over three or four times and paid each time. There are many men now prospecting on this channel. From Indian Springs up to Canada Hill there is a big scope of country little prospected. It takes a great deal of money to open these claims, but there is plenty of money in them. A large piece of ground is needed; it will not pay to run a long tunnel to open a small claim. It is for this reason the French company has honed a number of claims which can all be worked by the one tunnel.

The ore bins at the Richmond reduction works are full, and for the present no ore is being shipped down from the company's mine. It is probable that two of the furnaces will be fired up about May 20th.



DRIFT MINING REGION OF THE FOREST HILL DIVIDE.

ended in water and follows the oscillation of the shaking table, the heavier parts have a chance to settle and clinging to the smooth surface of the belt, arrive under the waterspreader, while the light sand is carried down to the foot of the table, where it is dropped into a waste launder.

The separation of the metallic minerals from the larger sized grains of sand, but about the same absolute weight, which were too heavy to be washed off with the lighter sand, is now effected under the jets of water which flow from the waterspreader. The force of the descending water takes hold of these grains of gangue and carries them now also down to the foot of the table; the revolving belt takes with it the particles of metallic minerals which, having weight and less surface and clinging tenaciously to the smooth belt—much more than the sand—offer also more resistance to the impact of the descending jets and are consequently carried over the head of the machine, to be deposited in the concentration box.

(To be continued.)

ABOUT 10,000 mines have been patented in the United States up to January of this year. Mr. Henry N. Copp, of Washington, has recently published a list of them, arranged by States and Territories.

The custom quartz mills of Nevada City are having plenty of work to do.

Fifth streets, and when the building shall have been finished it will be occupied by Garratt & Co. as a brass foundry.

The Pacific Rolling Mills are building a large number of yokes for the new Oakland cable railroad. They are doing all the metal work for the road-bed, and have a great deal of it delivered.

All the men who were at work on the iron mine belonging to the California Iron and Steel Company, at Clipper Gap, have left, the furnace having been shut down.

ADAMANTINE SHOES AND DIES.—Mr. H. D. Morris, of this city, formerly of the firm of Morris and Varney, is introducing a new thing for quartz mills in the shape of "adamantine" shoes, dies and crusher plates. They are warranted to outwear three sets made of any other metal. They are so made as never to break at the shank, and the wear is so light that little or no foreign matter gets mixed with the crushed ore. These appliances are made at the Chrome Steel Works, in New York State, and Mr. Morris has the agency for this coast. The shoes, dies, etc., have stood satisfactory practical tests elsewhere, and are now being introduced here. This chrome steel is also well adapted for drill points and other mining tools.

A LOCAL association has been formed to build a railroad from Billings, Montana, up the Big Horn river 100 miles; capital, \$1,000,000.

MECHANICAL PROGRESS.

A Cheap Mechanical Power.

The distribution of mechanical motive power is receiving increased attention in Europe. Should the problem once be solved, the great factory would disappear, so far as relates as to its repelling feature. The *Paris Temps* has just given an account of a cheap method of distribution which is actually at work in the French capital, in the Rue Beaunour, a locality in which a number of the small industries which peculiarly characterize Paris are carried on. The principle employed is that of rarefied air. By means of a large steam engine a vacuum of 75 per cent is produced in a pipe, from which smaller tubes branch off to each workshop. The workshops are severally provided with small motors, worked, of course, by means of the difference of pressure between the density of air in the tube and that of the atmosphere. Thus, the power can be distributed in quantities no greater than may be needed to work a sewing machine, for instance. Each workman is supplied with an automatic registering apparatus, and as he is able to shut off the power when it is not required; he is charged only for the quantity actually used. A fixed monthly rent is charged in addition to the installation, the rent being proportionate to the size of the motor in the workman's room. The principle of rarefied air has been adopted in preference to that of compressed air, because there is less danger of accident, and the inconveniences which might arise from the chilling consequences of the use of compressed air in small workshops are avoided. The importance of the economic distribution of motive power in fractional quantities in Paris is indicated by the fact that in one municipal division alone there are 5000 persons engaged in small industries, who require in the aggregate from 1000 to 1200-horse power per day. Taking the entire population of Paris, 40 per cent are engaged in such small industries.

RUSSIAN SHEET IRON.—The following method of manufacturing Russian sheet iron is given in "Calvert's Almanac." Selected iron is hammered into slabs of the right size, and to make a finished sheet the slab is passed through rolls, making 75 to 80 revolutions, three or four times, after which it is hammered again. Several sheets were then heated to a full red heat, covered with charcoal shaken on to them from a bag made of coarse linen, and are then piled with covering sheets of heavier iron top and bottom. The pile is then worked down under a heavy hammer until nearly of the finished size. When cool the hammering ceases, the plates are separated, reheated, and piled again with cold plates interposed, the hot and cold sheets alternating in the pile. This hammering is then repeated until they are cool, after which they are cut to size.

THE SUPERHEATED WATER THEORY.—The report of a committee appointed by the French Academy to inquire into the superheated water theory of steam boiler explosions has been published in the *Annales des Mines*. The committee did their work very thoroughly. They constructed suitable apparatus, experimented in the most exhaustive manner with it, and investigated several explosions claimed by the advocates of the theory to have been due to this cause. They failed utterly to superheat water under all conditions which could possibly occur in practice, and all the explosions investigated were shown exclusively to have resulted from simple deterioration of the boilers, or from carelessness. Their refutation of the theory is most signal and complete.

INSIDE SAFETY CHECK VALVES.—Many lives have been sacrificed by the breaking of steam or feed pipes connecting with boilers. This danger is said to be wholly overcome by a recently devised inside safety check valve, invented by the superintendent of motive power of the Pennsylvania Railroad Company. The valve, being located inside the boiler, is absolutely protected in case of collision and is certain to prevent such serious loss of life as has occurred where the feed or steam pipe connections have broken off from this or other causes. This valve, it is said, can be used on locomotive, stationary and marine boilers with equally good results.

SOMETHING NEW IN BOILERS.—A boiler has been made in France, in which the metallic surface exposed to fire, does not touch the water. The boiler, it is said cannot become red hot, but is enveloped all over by the same temperature. The vaporization is very great, and the last drop of water can be converted into steam, without any danger of explosion.

IN CHIPPING IRON.—To chip smooth after the chip has been started, the chisel should always be held at the same angle at which the chip was started and every blow of the hammer should be as near alike as possible; then, with common sense and practice, a person can chip nearly as smooth as he can file.

IN TUBULAR BOILERS the hand holes should be often opened and all collections removed from over the fire. When boilers are fed in front and are blown off through the same pipe, the collection of mud and sediment in the rear end should be often removed.

English or German Steel Castings.

Quite an animated debate occurred at a recent session of the Newcastle-on-Tynes Association of Foremen Engineers on the relative merits of English and German steel castings. Mr. Surtees, the chairman, alluded to the statement of a well-known man who had said that he bought steel castings from Germany, not because he got them free of duty, but because they were better than the home production. Another member, however, showed that as far as the cost was concerned there was a very material difference in favor of England.

Regarding the quality of the German castings, one member said that there was a firm in Germany who could turn out articles of a better appearance and surface than they could in England, but so far as the quality, generally, was concerned the German productions were greatly inferior to any English. "Even the superior looking steel from Germany was not nearly so good as that of England." The better surface of that special German steel might possibly be produced by some annealing process used by that one firm alone, but otherwise the whole texture and strength of the steel was far from being so good as the English material.

Will German Castings Stand the Test?

Several members stated it as their experience that German castings would not stand the requisite test, and "inspectors were known who were disgusted with it and would not pass it." The meeting generally agreed that the continental metal was lacking in solidity and toughness, but no definite opinion was expressed in the absence of scientific tests. The debate finally ran into the question of "protection," one member asserting that the only way to protect themselves from German steel was to put a duty on it. A Sheffield man recently said, on another occasion, that "the workmen of Sheffield will have less work to do if we do not close our ports against German goods." The question of protection appears to be rapidly growing in favor among many of the tradesmen and manufacturers of England.

COILED WIRE BELTING.—This comparatively new description of belting appears to be giving very good satisfaction wherever it has been introduced. It is used only for comparative light work, and of course requires good pulleys, such as are used for ropes. The belt is simply a coiled wire with its two ends simply hooked together. It is made of tempered steel wire and also of brass wire for light work, and is claimed to be ten times more durable than ordinary belting. The belt runs without slipping and which is quite peculiar, it continually changes its position, rotating at right angles to its forward motion while passing round the pulley. The surfaces of the coil thus wear uniformly. The ends of the belt may be simply hooked or fastened together by screwing hook-and-eye connections into the ends of the coil, or by swivel connections. By using friction clutches the belts can be used in the places of belts that are shifted at will from fast to loose pulleys. They can also be employed as straight, quarter, twist, cross or corner belts at any length, and for all purposes where leather or other belting is now used. Increase of power is also claimed as a result of using these belts.

THE WEARING OF BOXES.—One very frequent cause of boxes running hot is that by wear or grit or other causes the bearing will have grooves running around its circumference. In this case it is difficult for the oil to pass by these grooves and projections, and although one end or the middle of the bearing gets oil, the other is left without it. In this case, it is a good plan to file the bearing in the direction of the length of the shaft, but never in the direction of the shaft run—that is, following its circumference. This will give relief to bearing when almost everything else has failed. To avoid accidents from this cause high grade oils should be used, with self-oiling bearings. The shafting should be kept true and in line. All accumulations of dust, dirt, flyings, etc., should be frequently removed from bearings to prevent undue friction, as the heat thus generated may remain latent for some hours after the machinery has ceased running, and burst into flames when least expected, hence all important bearings should be frequently inspected during the first three hours after shutting down, in order to prevent disaster from this cause.

AN IMPROVED RAILWAY SEAT SPRING.—There is now on exhibition at the Royal Aquarium, Westminster, a new form of seat spring, which is applied, among other things, to the seats of railway carriages. The entire seat is carried on a coiled steel spring of peculiar form and is most luxurious, being free to move in all directions, so that every jerk and oscillation which the carriage can receive, is perfectly taken up. The springs are made by Mr. John Harrington, of Coventry.

THE PRESSURE GAUGE being an important fitting on a boiler should be so made that the figures on the dial can be easily read across the boiler room, so placed that it can be seen without hunting for it, and so put up that it shall at all times be subjected to the steam pressure in the boiler, and no other pressure, and should be corrected and kept correct by comparing it as often as may be convenient or necessary with some standard known to be correct.

SCIENTIFIC PROGRESS.

Manufacture of Crystal Balls.

Most of our readers have no doubt seen samples of those beautiful little spheres of rock crystal (quartz), which when very small are sometimes attached to watch chains; but, often, of larger size cherished and shown as mechanical curiosities. It has heretofore been supposed that they could only be manufactured by Japanese, from which country they have been introduced. It has been thought that no other people had the skill and patience to fashion such a hard substance as quartz crystal into such beautiful and perfect spheres.

For this reason such crystals, especially when of large size, such as from four to seven inches in diameter have been disposed of at fabulous prices. One of four and a half sold as high as \$1725; another of seven inches is held at a valuation of \$5000. It is the mystery which surrounds the production of these gems of art which has given them such value. It has been claimed that they are much harder than ordinary quartz crystals; but it is well known that such crystals are always and everywhere of precisely the same hardness. Those of sufficient size, however, to admit of being worked into spheres of the largest diameter are somewhat scarce. But still such are often found in the neighborhood of the gold mines of North Carolina, and some very large ones, we believe have been found in California.

A correspondent of the *Scientific American*, Mr. Wm. H. Hadden, of Newark, N. J., recently made a successful effort to have them manufactured in this country, the result of which is given substantially as follows: "I enlisted the services of a skilled lapidary, putting into his hands a piece of clear material from North Carolina, suitable for cutting a small sphere, and urging him to lose no time in completing the work. I was somewhat surprised and pleased to receive from the lapidary the finished ball within a week from the time the rough mass was put into his hands, the ball being perfect in every particular of roundness, polish and pellucidity. It measured two inches in diameter, and possessed every perfection and attraction belonging to a Japanese crystal ball."

This perfect sphere of quartz, the largest ever cut in America at the time, was exhibited at the North Carolina State Exposition of 1884 and at the New Orleans Industrial Exposition of 1884-85, at which places it received many encomiums from the press, as evidencing the resources of our country and the skill of American labor.

This article is particularly called forth by the completion, on Apr. 3d of this year, after only ten days' labor, of a superb crystal sphere measuring three and one sixteenth inches in diameter, and weighing exactly one and one-half pounds. As a piece of American workmanship in crystal, it stands alone, at this time; and in its various perfections is unexcelled, excepting in size, by any similar Japanese effort that has come under the writer's notice.

Therefore, possessing the requisite material, we can henceforth make crystal spheres, lenses, or even "bottles of stone," here within the United States, if the dilettanti should require them, or fashion demand such articles of luxury.

FORCE IN PLANT GROWTH.—The force exerted by growing plants can be easily measured. Darwin took a spring clothespin, measured the force necessary to open it, and then fastened it upon the growing root. He found that the pressure was of many ounces. President Clarke of Amherst Agricultural college made some interesting experiments with a growing squash, which was harnessed and had levers attached in such a way that the force exerted could be ascertained. It was equal to thousands of pounds, and finally the harness broke. In a graveyard at Hanover, Germany, a block of stone containing twenty cubic feet has been thrown out of place by a tree growing from a seed which germinated in the crevice of the rock. It has already been lifted over five inches.

HEARING.—It has been found by Dr. Tait that the ear in women can perceive higher notes—that is, sounds with a greater number of vibrations per second—than the ear in men. The highest limit of human hearing is somewhere between 41,000 and 42,000 vibrations per second. Few persons have equal sensibility to acute sounds in both ears, the right ear usually hearing a higher note than the left. The lowest continuous sounds have about 16 vibrations per second.

THE AVERAGE HEIGHT OF EUROPE has been estimated by a German geographer to be 974 feet. Switzerland shows the greatest mean height, 4624 feet, and the Netherlands the least, 31 feet. Intermediate are Spain and Portugal, 2298 feet; Austria, 1695; Italy, 1696; France, 1292; British Islands, 714; Germany, 701; Russia, 548; Denmark, 115.

TELESCOPES.—The principle of telescopes was described by Roger Bacon about 1250, and Leonard Digges, who died about 1573, is said to have arranged glasses so that he could see very distant objects. Galileo constructed telescopes in 1609, and discovered Jupiter's satellites in 1610.

A New Saccharine Substance.

Allusion has already been made in these columns to a new saccharine substance which has recently been obtained from coal tar. It has heretofore been known as "benzoyl sulphuric imide," but it will hereafter be known by the simpler term—"saccharine." The discoverer is Dr. Fahlberg, and its preparation and properties were recently described by Mr. Ivan Lsvinstein at a meeting of the Manchester Section of the Society of Chemical Industry. Saccharine presents the appearance of a white powder, and crystallizes from its aqueous solution in thick, short prisms, which are with difficulty soluble in cold water, but more easily in warm. Alcohol, ether, glucose, glycerol, etc., are good solvents of saccharine. It melts at 200° C., with partial decomposition. Its taste in diluted solutions is intensely sweet; so much so that one part will give a very sweet taste to 10,000 parts of water. Saccharine forms salts, all of which possess a powerful saccharine taste. It is endowed with moderately strong antiseptic properties, and is not decomposed in the human system, but eliminated from the body without undergoing any change.

It is about 230 times sweeter than the best cane or beet-root sugar. The use of saccharine will therefore be not merely as a probable substitute for sugar, but it may even be applied to medicinal purposes where sugar is not permissible. One part of saccharine added to 1000 parts of glucose forms a mixture quite as sweet as ordinary cane sugar. The present price is 50 s. per pound, but although very high, this is not prohibitory, as its sweetening power is so great; but it is probable the cost of its manufacture will soon be very considerably reduced. The *Brewers' Guardian* says: "This new compound will be of great interest to brewers, for not only is it perfectly wholesome, but it possesses, in addition to its intensely sweet taste, decided antiseptic properties, and therefore may be usefully and advantageously added to beer."

Interesting Results of Deep Sea Explorations.

Among the interesting results of submarine or deep-sea explorations conducted under the auspices of the London Geographical Society are those in reference to the Atlantic sea bed. It would seem that the bottom of the North Atlantic is occupied by two valleys, the eastern extending from 10 to 30 degrees west longitude, and traceable as far as the equator, with an extreme depth of less than 13,000 feet, while the western valley reaches from the 30th to the 50th degree of west longitude. The two are separated by a ridge in 30 degrees west longitude, along which the average depth is only 1000 fathoms, and which can be traced northward to Iceland and southward to the Azores; it is volcanic in character at both extremities. Its extreme breadth is somewhat less than 500 miles, and the depth of the water increases on both sides of it according to the distances of the axis.

A Volcanic Region in the Atlantic.

Another interesting discovery has recently been made known which is alluded to as follows: Recent observations indicate the existence of a submarine volcanic crater between the Canary islands and the coast of Portugal. From a cable-laying steamer, in latitude 39 degrees 25 minutes north, longitude 9 degrees 54 minutes west, the water was found to measure 1300 fathoms under the bow and 800 fathoms under the stern, showing the ship to be over the edge of a deep depression in the ocean bottom. An English geologist, T. Mellard Reade, remarks that great inequalities are found in the bed of the sea of Lisbon, due probably to a submarine chain of mountains.

TORNADO POINTS LOCATED.—In a report to the French Academy of Sciences, on the 172 tornados recorded in the United States in 1884, Mons. Faye considers it established that there is a definite portion of an era of low barometer most favorable to tornados. The signal service reporters are now endeavoring to determine this "dangerous octant" still more accurately. A memorable day in the history of tornados was Feb. 19, 1884, when no less than 45 was recorded in the southeastern States, attended with a total loss of 800 lives, and 2500 injured, 10,000 houses and buildings destroyed, and 15,000 people left homeless.

PHOTOGRAPHIC PROGRESS.—The possibility of photographing in the dark has been shown by Abney, an English experimenter. He has succeeded in preparing plates which are sensitive to the rays lying beyond the red end of the spectrum—the dark heat rays—and with such plates used with a rock salt lens it should be possible to photograph bodies having a high temperature, although that temperature may be far below that necessary to render them self-luminous.

NORTH AMERICAN FISHES.—Naturalists now count no less than 1870 different kinds of fishes in North American waters, of which 590 live in the rivers and lakes, and 550 kinds belong to the Pacific. Of the remainder, 105 dwell only in the deep waters of the Atlantic and Gulf of Mexico, never approaching the shores or the surface.

ENGINEERING NOTES.

Railroad Activity in California.

Great activity in railroad building is manifested just now in this State. It has long been felt that there are many undeveloped localities and some extensive regions in the State which need short lines of railroads to connect them with the great main arteries of commerce which traverse the State along its principal lines of travel. The time has come when no community can expect much prosperity or any considerable growth without the modern facilities of transportation. Our principal railroad builders have evidently become impressed with the idea that the people are so earnest in their demands for these improvements, and that if they do not provide the facilities needed others will. Under this stimulus the Southern Pacific is extending its line from Soledad down through Santa Barbara and San Luis Obispo counties, a rich region heretofore fenced in by mountains. The California & Oregon is being rapidly pushed to completion and so is the California & Nevada. The San Francisco & North Pacific is about to build a cross-country branch running to Napa Junction. A narrow gauge road is projected in Lake county. The South Pacific Coast is building a branch running to New Almaden and is projecting other work. The North Pacific Coast talks of an extension toward the north along the coast. The Southern Pacific Company intends to speedily build a branch which will run up into Mendocino county and tap the rich lumber region. A number of small narrow gauge roads are either being built or are projected in various parts of the State. This is all very satisfactory and augurs well for the progress of the State. A contemporary truly says: "We need these roads badly, and the more we get of them the better, for by their aid the faster the State will grow and the richer will it get."

ANOTHER GREAT BRIDGE.—Some \$3,000,000 are to be expended in a giant bridge across the Ohio river at Cairo, Illinois. The structure is to be built by the Illinois Central Railroad Company, and will require more than three years for its completion. The bridge will be entirely of steel, and will rest on piers of solid masonry about 170 feet high or more, and a truss pattern, extra heavy, will probably be chosen. The question of fixed span or draw has not been determined. The length of the bridge will be about 5000 feet, and there will be an equal length of iron or steel approaches ascending at a grade of about 40 feet to the mile to the level of the bridge. But a single track will be provided for. The low bottoms on both sides of the river render the undertaking one of great magnitude, but its importance would seem to overshadow the difficulties to be overcome. Such a plan has been proposed from time to time in the past, but never came to a focus. The present one is a result of increasing urgency, and no obstacles dangerous to its consummation have presented themselves.

HYDRAULIC POWER DISTRIBUTION on a large scale is still gaining favor in England, and since the first attempts in that line made in Hull about eight years ago progress has been steady and encouraging. The London Hydraulic Power Co., which is now attracting special attention, was organized in 1882 by the originator of the Hull scheme, and in both cities financial success has been thoroughly assured. The consumption of water has rapidly increased since operations were commenced, and the power is now extensively employed at docks and railway stations, in warehouses and manufacturing establishments, and for operating elevators, cranes, presses, hammers, etc. Thus far there have been remarkably few leaks or breaks, which is especially remarkable when it is remembered that these pipes must be threaded through the intricate system of other pipes, conduits and tunnels already existing in underground London. Liverpool is to have a similar system for the supply of water power.

AN IMMENSE DYNAMO.—The Brush Electric Company, of Cleveland, are building the largest dynamo in the world. It will be 12 or 13 feet long, 5½ feet wide, and weigh ten tons. It will give a current of 122,500 amperes; a number of watts, 245,000. In the world it will be four times the size and capacity of the "Jumbo" machine exhibited by Edison at the Electrical Exposition at Philadelphia. The latter was adequate to the task of running 5000 sixteen candle power incandescent lights. This monster machine of the Brush people will be shipped to Lockport, N. Y., and used for the smelting of "aluminum," it is said. Five hundred horse-power will be required to drive it, which will be furnished by water, with the aid of turbine wheels.

THE SONOMA INDEX TRIBUNE says that a corps of engineers is actively engaged in surveying the proposed branch road from Novato to Sears' Point, on the line of the Sonoma Valley Railroad. It appears that an extension to connect with the Central Pacific is not contemplated.

TELEGRAPHIC FACILITIES are being rapidly extended so as to connect all the great commercial centers. Peking, the capital of China, is now connected with London by telegraph.

USEFUL INFORMATION.

How to Design a Monogram.

Scarcely anything seems so easy as to design a monogram, yet we see very few successful ones, the most of them being a mass of mixed up letters and ornaments of which we can find neither the beginning nor the end. There is a law regulating the designing of everything, and it is this law which the true designer keeps in mind and applies to his work; the effects of obedience to this law and its violation are seen as clearly in the design for a monogram as in the design for a cathedral.

First, there should be harmony of composition, that is, the letters should so emphasize, subdue or control each other that the composition should impress us as compact, appropriate and, being so, beautiful.

Second, there should be an unnecessary ornamentation; there should be a quiet and peace about the design which will always please the truly artistic. Looking at some designs, we get the impression that ornament was so plentiful that the designer saw no other means of consumption than that of hurrying his designs in it, for we see that there is a mass of curves, angles, shades and leaves, but nothing else.

Third, simplicity of lettering is an important requisite, as there should be no possibility of mistaking an E for a G or C, and the boundaries or outlines of the letters should be well defined.

Fourth, the order of sequence of the letters should be carefully attended to.

The common idea is that a certain number of letters are given with which to make a pleasing design, and so far that impression is right; but there is something beyond this. There is the art of so placing the letters that one can distinguish at a glance the first, the central and the last letter. Now, the rule to be observed to secure this result is as follows: The last letter of the monogram must be the principal feature and must be the largest, the boldest and the heaviest letter; then the first letter must be the next in size, but the lightest in outline and color; then the central letter must be the smallest, and of an intermediate tint. If the monogram is of four letters, the two intermediate must be of the same size, and the second letter lighter in outline and color than the third.—*Art Amateur.*

COST OF CARS.—A first class standard eight-wheel American locomotive, with automatic train and driver brakes, is worth \$7000. A modern sleeper, with 42-inch steel-tired wheels, six-wheel trucks and steel axles, is worth about \$10,000. A parlor car, with 42-inch steel-tired wheels and steel axles, toilet room and upholstered chairs, is worth about \$5800. A first class coach, with toilet room, patent car warmer, 42-inch steel-tired wheels and steel axles, is worth about \$5500. A second-class coach, with 33-inch steel-tired wheels and steel axles, and patent car warmer, is worth about \$4200. A postal car of modern design, with 42-inch steel-tired wheels and axles, is worth about \$3000. A 50-foot baggage car, of modern design, with same running gear, is worth about \$2000. A standard 34-foot box and stock car, with swing motion trucks and cast wheels and iron axles, is worth about \$400. A coal cart with same trucks is worth about \$325. A standard flat car is worth about \$300. Caboosees are worth from \$800 to \$1000, owing to the build.

STEAM VS. HOT AIR FOR CASKS.—We suppose that no difference of opinion exists at the present time respecting the evil of steaming casks. Not only do you cause the timber to perish, but you provide in the most efficient manner, for the early acidity of the wood surface if left exposed to atmospheric influence. Now, hot air, in motion, at a temperature of 350 degrees F., has quite a different action. Long practice has demonstrated that such a temperature of traveling air has no influence on the wood itself, while it is sufficient to kill all germs of whatever type, and all traces of evil smell or mouldiness will be removed. We cannot commend the system too highly, being convinced that it is far superior to any other method of procuring not only clean but dry and sweet shipment casks; for few are aware, perhaps, of the evil effects of using casks for racking which, for instance, are not free from excessive quantity of moisture.—*Brewers' Gazette.*

MUSICAL SEWING MACHINES.—The latest attachment to the sewing machine is a mechanical device by which the machine, when in motion, plays a succession of lively tunes. Another mechanical novelty interesting to ladies is the application of electric light to piano-fortes. The material and mechanism are concealed inside the case, so that the light is provided for the performer without any apparent disturbance of the ordinary arrangements. Both these inventions are of French origin.

TO REMOVE CLINKERS.—To remove clinkers from the stove, sprinkle common table salt on the linings when the stove is cold. Use plenty of it. Build a moderate fire—wood and coal—and in a day or two the clinkers will be gone.

CAYENNE PEPPER blown into the cracks where ants congregate will drive them away. The same remedy is also good for mice.

MAPLE SUGAR.—Wiley has examined the sap of the sugar maple, and finds that saccharose is almost the only sugar present; it varies from 1.95—3.5 per cent. Maple sugar generally contains more than 80 per cent of saccharose. The sap contains .0088—.0103 per cent albumoids; no starch; acid equal to .00005—.005 per cent malic acid; and ash .146 per cent. A very little glucose is found toward the end of the season. This peculiarity of maple sugar renders its adulteration very easy. A Painesville, Ohio, paper says that a farmer recently brought to town and sold 500 pounds of what he called new sugar. A day or two after a Painesville gentleman visited the "bush" of said farmer and found not a tree had been tapped this year. The farmer informed the gentleman, however, that a good way to make new sugar early was to "mix last year's sugar with canned syrup, boiling together gently."

TO DETERMINE THE SIZE OF A BLOWER.—A correspondent of a lumber journal asks: "How can I determine the size of a blower necessary to remove sawdust and shavings from a flooring machine, a large angle surface planer, a four side 'sticker' and a small circular saw?" The answer is given as follows: The pipes from the above machines should be respectively 7, 5, 4 and 3 inches in diameter. Circles are to each other as the squares of their diameters; therefore, the area of the four pipe is about equal to one pipe 10 inches in diameter. A blower should be in diameter, about three times that of its induction pipe, which in this case will make it 30 inches. We should by all means put in a 36-inch blower which will allow you to put in an extra pipe or two in case you enlarge your plant.

A MURAL MIXTURE.—Pulverized steatite is coming into use as a very superior finish for walls and ceilings. Steatite is simply soapstone. When put upon the wall it takes a high polish, is pearl gray in tint and presents the best possible surface for painting, whether in oil or water color, and will neither crack nor chip. It can be washed without injury, and when subjected to heat, moisture or chemical fumes it gives no smell and does not turn yellow with age. It appears to be well adapted for hospitals, factories, cellars, markets, etc.

INCREASE IN THE CONSUMPTION OF SUGAR.—As late as the year 1700, all England consumed only 20,000,000 pounds of sugar in the course of the year, but since then the consumption has greatly increased, twenty million hundred weight now being used by the English people. The process of refining sugar was not known previous to 1659. The increase in sugar in this country, has been much greater in proportion than in England.

GOOD HEALTH.

INFLUENCE OF TOBACCO ON THE HUMAN SYSTEM.—One of the effects of tobacco is a tendency to produce fatty degeneration of the tissues, nearly all of them being subject to this. The popular notion that the use of tobacco will prevent corpulency is a deception, except as it interferes with healthy nutrition. A very general effect is fatty degeneration of the muscles, especially those of the heart. Persons whose systems are saturated with tobacco are very slow in recovering from sprains or bruises of the muscles, nor do they bear surgical operations well. But the most serious effect is "tobacco heart," which is a rupture of this organ from the deposit of fat cells in the fibers of the muscles, which destroys their integrity and is immediately fatal. It occurs mostly in young persons. Another effect of tobacco is a tendency to produce cancerous affections. Fat is the lowest healthy tissue; its uses are to store up the means of nourishment. A little lower than this we find cancer cells in the blood and in various tissues. Tobacco changes the condition of the blood, reducing the disks, which in the healthy condition are round like a coin and regular, to about two-thirds their natural size, and making them rough and wrinkled.—*Henry T. Child, M. D.*

EXPERIMENTAL YELLOW FEVER.—Dr. Carlos Finlay, of Havana, has published the results of several experiments he has made on the inoculability of yellow fever. He performed the operation, or rather got it performed for him by mosquitoes, which he caused first to sting a patient suffering from yellow fever and shortly afterward a healthy person who was to be (with his own consent of course) the subject of the experiment. He found that the disease was only inoculable from the third to the sixth day. When two mosquitoes were employed, so that a double dose was given, the symptoms of the experimental disease were somewhat more severe than when only a single mosquito was used. Of eleven cases of inoculation, six were efficacious, one doubtful and four negative. The period of incubation varied from five to 14 days; the symptoms consisted of headache, pyrexia, injection, with sometimes an icteric tint of the conjunctiva, and in some cases albuminuria. The fever lasted, as in the ordinary form, from five to 21 days. The author believes that this method of producing artificial yellow fever will ultimately be found very valuable as a prophylactic against the natural and dangerous form of the disease.—*Lancet.*

Curative Power of Water.

There is no remedy for such general application and none so easily obtainable as water, and yet nine persons in ten will pass it by in an emergency to seek for something of less efficacy. There are but few cases of illness where water should not be given the highest place as a remedial agent.

A strip of flannel or a napkin folded lengthwise and wrung out of hot water and applied around the neck of a child that has the croup will usually bring relief in ten minutes. A towel folded several times and quickly wrung out of hot water and applied over the seat of pain in toothache or neuralgia will generally afford prompt relief. This treatment in colic works like magic.

We have known cases that have resisted treatment for hours yield to this in ten minutes. There is nothing that will so promptly cut short a congestion of the lungs, sore throat or rheumatism as hot water when applied promptly and thoroughly. Pieces of cotton batting dipped in hot water and kept applied to all sores and new cuts, bruises and sprains is the treatment now adopted in hospitals.

A sprained ankle has been cured in an hour by showering it with hot water poured from a height of three feet. Tepid water acts as promptly as an emetic, and hot water taken freely half an hour before bedtime is the best of cathartics in the case of constipation, while it has a most soothing effect on the stomach and bowels. This treatment continued for a few months, with proper attention to diet, will alleviate any case of dyspepsia.—*Ex.*

DISEASE AND DUST.—Within the last few years some attention has been given to the diseases which are directly traceable to the inhalation of air charged with particles of dust. It is well that preventive measures should be taken in order to insure protection to workmen against the injurious effects of dust. The air in workshops should be renewed three times an hour. The introduction of fresh air and the expulsion of the air in the room will very materially lessen the dust, and save the lungs. Better, however, than this, are contrivances for drawing off the dust immediately from the place where it is produced. Where there is but a little, the airing produced by chimneys may be sufficient; where there is a great amount it should be drawn off by a revolving apparatus creating a continual current of air.

VACCINATION FOR CONSUMPTION.—The chief disease of temperate climates being consumption, any means which will check its ravages must be hailed with joy and gratitude by a large part of the human race. In France is now projected an experimental inquiry into the possibility of finding some method of attenuating the supposed virus of consumption so as to make inoculation therewith practically useful against the disease, either as a preventive measure, like vaccination against smallpox, or as a means of cure, like Pasteur's inoculations in hydrophobia. Although the chances of success are remote, the investigation is approved by eminent scientific men and a considerable sum has been subscribed toward defraying the expenses.

MALARIA ALTITUDES.—While malaria has its ordinary habitat in low-lying regions, it may, under favorable conditions, exist at great elevations. On the Tuscan Apennines it is found at a height of 1100 feet above the sea; on the Pyrenees and Mexican Cordilleras, 5000 feet; on the Himalayas, 6400 feet; on the island of Ceylon, 6500 feet, and on the Andes, 11,000 feet. At present, the elevation of entire acuity has been thus approximated for various places: In Italy, 400 to 500 feet; in California, 1000 feet; along the Appalachian chain of the United States, 300 feet; in the West Indies, 1400 to 1800 feet. In any of these regions, however, malaria may drift up ravines to an indefinite height.

DISINFECTING OF ROOMS.—M. Koenig recommends mercuric chloride. The windows, chimney, etc., are carefully closed up, and 50 grams mercuric chloride are placed in any suitable vessel, which is then set on a pan of burning charcoal, the operator immediately leaving the room and closing the door. After about four hours he re-enters, with a cloth over his mouth and nose, and throws open the windows. After some hours of ventilation a slight atoning with sulphur is made to follow, which neutralizes any remnant of mercury. This process not merely disinfects, but destroys all kinds of vermin.

BLEEDING AT THE NOSE.—The best remedy for bleeding at the nose, as given by Dr. Gleason at one of his lectures, is in the vigorous motion of the jaws as if in the act of chewing. In the case of a child a wad of paper should be inserted to chew it hard. It is the motion of the jaws that stops the flow of blood. This remedy is so simple that many will feel inclined to laugh at it, but it has never been known to fail in a single instance, even in the severest cases. So says the *Scientific American*.

TEA.—Dr. Burney Yeo, of London, reports the curious observation that there are persons who usually drink tea without injury, but in whom when in a depressed mental condition it occasions indigestion and palpitation of the heart.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

Downs.—*Ledger*, May 8: We learn that work on the Downs mine near Volcano is to be resumed forthwith. At a meeting of stockholders held recently it was decided to spend \$15,000 in prospecting. The shaft is to be sunk deeper. No shaft of 600 or 700 feet has been sunk in the entire district, and hence the idea prevails that the gold-bearing quartz exists only near the surface. But the truth or falsity of this proposition has never been demonstrated, but an effort in that direction is now about to be made by this company. George W. Parker is to superintend the operations.

AMADOR CITY NOTES.—A correspondent sends the following mining notes: The Gover mine is running its 20-stamp mill on good rock at present, having struck a large body of the same a short distance north of the old shaft. The friends of Mr. Call will, undoubtedly, be pleased to hear this good news, as he has had uphill work at this mine ever since he started two years ago. The Bunker Hill appears to be starting on a new era of prosperity. The mine has been looking very poor for some time, so much so that only a portion of their 40-stamp mill has been running. Recently they have struck a body of ore on the 700-foot level that prospects quite well. They are now running 20 stamps on this ore, and if it proves as good as it looks more stamps will be running very soon. The company is taking advantage of this partial stoppage of the mill to make a thorough overhauling of their Frue machines, and with new belts will make the machines as good as new. Their chlorination works are still in operation, having been run continuously for 12 months on sulphurets made by their own mill. The old Keystone keeps on as usual, and well merits the term applied to it by the San Francisco people, viz., Old Reliable. The South Spring Hill people continue to talk about the wonderful offers they have had for their property, ranging from \$1,000,000 to \$2,000,000. If it is half as good as they represent it Amador can well be called the banner town for good mines. The Wabash, just south of the South Spring Hill, is rapidly coming into prominence. Although but little prospected it has a good reputation outside. About 200 tons of ore was taken out last season and crushed at the Mahoney mill in Sutter creek. The results of this test proved to the owners they had a good property. The principal owner, L. T. Lewis, secretary of the Keystone Company, thinks there are "millions in it," and he will not be likely to sell this mine unless he gets a handsome price. On the whole the outlook for Amador in the way of mining was never brighter.

MISCELLANEOUS.—The St. Julian mill at Middle Bar was started last Monday, with encouraging prospects. The Volcano Gold Gravel Mining Co., operating in Volcano basin, have had a very prosperous run the past season as far as the water supply is concerned. They are operating in what is believed to be better ground than any previously worked, and the surrender of gold ought to be much larger than usual. Indeed, it is the general impression that if the claim does not pay this year there is very little hope of it ever paying. All the deep mines of the county have been troubled with an increased flow of water, which has taxed the pumping facilities to the utmost to control. The increase of water is attributed to seepage incident to the last heavy rains. Both at the Zeile and Kennedy they are having more water to contend with than at any time during the winter. The gravel claim of J. H. Hill near Oleta, which has been leased and run by outside parties, is, we are informed, turning out remarkably well. Very rich gravel has been met with the past week or two, some of it prospecting as high as \$3 to the pan. Another lot of rich ore was taken from the Middle Bar tunnel this week.

Calaveras.

MURPHYS.—*Cor. Mountain Echo*, May 6: The Central Hill hydraulic claim, owned by McCormack, Bisbee & Tower, near Murphys, is running in full blast day and night. Quite a force of hands are employed at this mine, all of whom are white laborers. Chinamen need not apply at the celebrated Central Hill mine. A good clean-up is expected, as very rich gravel is being washed at present. The Oro Plata mine, situated about one-half mile from Murphys is making an excellent showing. The mills and concentrators, which are claimed to be the most extensive in the county, are kept in motion day and night. A large number of men are employed here. The property is a remunerative one, and being very extensive, bids fair to continue so for many years.

El Dorado.

MILL.—*Georgetown Gazette*, May 8: The proprietors of the Robert Burnham mine, between Georgetown and Georgia Slide, have purchased a new five-stamp mill from Morey's foundry at Placerville, which was brought up this week. The stamps weigh 650 pounds each, and will soon be pounding away on pay ore. Monday we had the pleasure of meeting with Chas. A. Farrar and O. P. Vaughn, the enterprising and successful gravel miners at Mt. Gregory. They brought down a quantity of dust which speaks well for the quality of the pay gravel they are preparing to work in a systematic way this season. The old Fairchild claim, owned by Barklage, adjoining and on the same channel, is said to be paying largely. Adjoining is Dr. Spencer's mine, considered by these miners to be a valuable property.

Inyo.

MILL.—*Inyo Independent*, May 8: There is strong probability that John Eddy will build a new mill at Panamint within a few months. For some time past he has had a few miners at work out there prospecting, and the developments in some of his claims, more especially the Jacob's Wonder, are such as will induce him to build a mill.

BULLION.—At the beginning of the week Jack Welch brought in from Fish Springs a dab of gold bullion worth \$500. Jack and Charley Hoole have been at work all winter and spring; they have netted

\$140 a month each. They work their ore in an arastra, and appear to have enough to keep them busy as long as they may want to stick to it. Bullion from the furnace at Lookout has been arriving at Keeler for several days past. Mr. Fitzgerald writes as follows: "The furnace has been doing splendidly for the past six days. Had several mishaps in starting up on account of leak in boiler, and also had leak in water jacket, which delayed me three days."

Mariposa.

BUENA VISTA MINE.—*Mariposa Gazette*, May 8: We learn that the new shaft being sunk at the Buena Vista mine is down over 100 feet. The work is being vigorously pushed by day and night shifts. Lorenzo Alvord is the boss and the sinking and timbering is being done in the most substantial and workmanlike manner. The shaft is sunk by the side of the vein which is in sight all the way down. The ore is of a dark character containing black oxide of iron and sulphurets which indicates a close proximity to a rich body of pay rock. We understand that the mill will probably commence crushing the ore within a month's time.

MCCANN MINE.—Dr. Robinson has just returned from San Francisco where he has been purchasing some additional machinery for the mine. A new shaft has been in progress for some time, and at present the men are engaged in clearing away the rocks and leveling up the foundation for a mill-site and hoisting works. We can safely look forward to a respectable mining boom in the course of the next two or three months arising from the two mines above mentioned. There are other mines of a permanent character which are expected to crop out extensively in the course of the spring season now at hand. This mine is supposed to be a continuation of the Diltz mine. The rainy season being about over the washing off the deep dirt from the surface will soon have to be suspended. Work has been greatly retarded by the large landslides which slid in upon the main point where profitable mining was expected and necessarily had to be removed. This has all been got away and considerable wash has been done on top of the ledge which is about 45 feet wide lying in strata. The lower or fourth strata from the surface proves to be very rich, and all the dirt and vein matter which passes through the wash pays seven and eight dollars a day to the hand. The rock is piled and saved for milling purposes hereafter. Several handsome nuggets have been picked up during the winter and there are undoubtedly many more left.

Nevada.

MOORE'S FLAT.—*Nevada Transcript*, May 8: Work was resumed last Monday on L. F. K. Buch's quartz ledge. After running ten feet a promising looking vein about six inches in width was struck. There is a fine ten-stamp mill on the ledge, and the stamps will begin to crush rich-looking ore on the 15th. The mine is being run under the superintendency of J. D. Rogers, an experienced quartz miner. In the Copper Hill mine, owned principally by D. R. McKillican, who is president of the company, and superintended by A. J. Ross, a rich pocket was uncovered on Saturday last. This is not the first pocket discovered this winter. Some few weeks previous to the present writing, a \$10,000 dividend was declared. If rumors are true, \$100,000 has been extracted during the last four months. The company is constructing a wagon road to connect the mine with the stage road for the purpose of bringing in the machinery necessary to erect a mill. As soon as the mine is opened up employment will be furnished for quite a number of men. It is estimated that the road, which will be finished in ten days, will cost about \$4,000. Messrs. Hart & Bond, formerly residents of Nevada City, recently struck a promising vein in a lode bonded from Davis & Hathaway. The ledge was struck after 300-foot crosscut had been run. Free gold can be seen in the samples brought to town. Geo. Coppras, who has brought many rich specimens to town from pockets near the surface, is running a crosscut tunnel to tap the vein lower down. He has struck ore which will pay \$10 to the pan. D. R. McKillican, who has run a bed-rock tunnel under the gravel channel at Snow Point, will shortly raise an incline to tap the Blue Gravel channel. On this lead are situated the famous Derbec and Malakoff mines. During the last two weeks forty men have been put to work in the vicinity of Moore's Flat. During week days the town looks deserted, but on Sundays and stormy days it has the appearance of olden times.

CROWN POINT.—*Grass Valley Union*, May 5: The new ditch from the Idaho to convey water to the Crown Point and Badger Hill mines is completed, and Crown Point will commence the use of the water as soon as a pipe-line is laid down from the ditch to the works, which will give a pressure of 85 feet, and afford considerable more power than has been obtained by taking the water from Wolf creek. The mine continues to yield well, and the ledge at the bottom of the shafts which is 300 feet in depth, is looking very well. The ledge is seven feet wide, and makes a good showing of gold. No drifting had been done at the bottom of the shaft when the mine was formerly operated, but drifts are now being run both ways from the shaft. In cleaning out the shaft it was found that an old drift existed 20 feet below the 180-foot level which Mr. Gauthier has opened, but it was walled up at the distance of 20 feet from the shaft, and there is no knowledge existing as to how far it was extended by the former company, but it is evident that some very poor mining was done, as the miners run over the ledge, which was on the foot-wall and set their timbers upon it to hold up the drifts, and never broke into the ledge at all. The prospects of the Crown Point continue as favorable as ever, the ledge both on the 180 and 300 levels, being large and of excellent paying quality.

SLATE.—*Grass Valley Union*, May 9: Francis & Co., lessees of the Slate Ledge mine, at Forest Springs, have an excellent showing in the lower level of the new shaft, where the west drift has opened up a vein four feet in width, which prospects well in free gold. This is the largest vein ever found in the mine, and gives great encouragement as to future results. The lessees have now out sufficient ore to commence crushing, and to-morrow Perrin's mill will start up on it, and will continue to run for an indefinite time. Beside this new strike in the Slate Ledge, the tunnel in the Perrin ground, adjoining on the west, which is in a distance of over 600 feet, has opened on the same vein, the ledge at the present time showing eighteen inches in size of good milling rock. This tunnel is lower than any workings in the Slate Ledge or Noram-

bogua mines, and will afford drainage for both of these properties if extended through them.

TUNNEL COMPLETED.—The tunnel on that branch of the new Idaho ditch through which the water is to be conveyed to the Badger Hill mine, has daylight through it, and is about completed. The receiving reservoir near the end of the tunnel, from which water is to be conveyed through a pipeline to the works, requires some days work upon it to make the embankment water-proof, and in addition to this the pipe is to be connected. It is estimated that everything will be in readiness to start up work at the mine not later than the 15th inst.

Placer.

THE HAZARD.—*Placer Herald*: We learn from Col. J. H. Keown, superintendent of the Hazard drift mine, at Michigan Bluff, who has been in Auburn this week, attending to his duties as supervisor, that he is running the tunnel in the Hazard ahead in the channel using a full force and springing no time, and that the ground prospects favorably, and the outlook, all things considered, is very encouraging. The colonel has stuck to this mine with a persistence worthy of the greatest success, and it is pleasing to know that his perseverance is likely soon to be rewarded.

San Bernardino.

CALICO.—*Print*, May 9: There are few idle men in camp at present. The miners are either employed in the various mines or chloriding and prospecting for themselves. Chloriding operations are on the increase owing to the general success in this character of mining. The merchants and all other business men anticipate unusual lively times within the next two or three months, owing to the improvements going on or anticipated.

HUMBURG.—Reed & Goddard have four men at work on this mine taking out some very fine ore. They take out about one ton a day and average about 100 ounces to the ton. They ship twice a month to Barber's mill. Wm. T. Coleman & Co. are hauling monthly about 75 tons of borax from their deposits in East Calico to the Daggett depot. There seems to be no end to the supply of this commodity in their mines, which is of a high grade. Both leaching works are occupied to their full capacity in reducing low grade ore and daily adding to the bullion output. It is reported that the Red Jacket mine is about to be sold or leased to a prominent mining company.

MILL IMPROVEMENTS.—The old amalgamating pans and other machinery of the Oro Grande Co.'s mill near Daggett are being replaced by new machinery, and the entire mill is being renovated and improved. The alterations are so gradual as to only partially interfere with the operations of the mill, which is reducing ore from the Waterloo mine in West Calico. When the proposed addition of 15 stamps is made to the mill then the present force in the King mine will be considerably increased, and unusual activity will be seen in and around this valuable property.

COMET.—Woolman & Hoben, are working this old time mine. They started on a "knife blade" seam which widened out into a very large pocket, from which they took out three tons in twenty days which netted over \$700 at Barber's mill. They are now running a tunnel, which is now in about 16 feet, to tap the tunnel which contains the ore at a depth of 25 feet. They are running night and day shift. Mr. Meyers of the Pinto, is running a tunnel across the southeast end of the Little V to tap the Pinto, the shaft is down 25 feet and is sunk in an ore deposit.

THE NEW MILL.—Part of the machinery for the Runover Mining company's new twenty stamp capacity quartz mill is now on the site about 100 yards above the company's well. The work of erecting the mill will progress as rapidly as possible under the directions of J. L. Patterson, the superintendent. When the mill is completed a larger force of miners will be employed in the company's mines which will greatly enhance the business interests of the camp, and add to the present prosperity of this flourishing district.

EXCHEQUER.—Capt. Brisen and Jas. Reed are working on the Exchequer mine, which shows up well. A depth of 60 feet has been attained and ore of a fair grade has been uncovered the entire length of the shaft. Ore is now being taken from one of the tunnels. This mine is situated on a well-defined ledge of ore, and in the same belt with the famous Garfield mine, and not far from the latter. This mine would be a fine paying proposition for a company having ample milling facilities of its own.

VETO.—Cheatham & Leonard, who have had a lease on this mine for the last five months, have their men at work and are taking out about one ton a day of very good ore. They are stopping over the tunnel, which is in 60 feet, right and left, also a drift 50 feet and a crosscut 60 feet to left and 50 to the right. They ship 7 tons twice a month and average from 40 to 500 ounces to the ton.

Sierra.

BULLION.—*Mt. Messenger*, May 8: About \$75,000 in bullion went below Wednesday from the Sierra Buttes and Young America mines. Very rich quartz was shown us a few days since, which came from Keystone ravine. The ledge is from three to five feet wide.

BULLION SHIPMENTS.—*Sierra Tribune*, May 8: For the month of April the Young America mine yielded \$27,620. A dividend (No. 5) of four cents per share has been declared for that month, aggregating \$20,000. For 20 days run the Cleveland mine, with eight stamps and a working force of 17 men, turned out the snug sum of \$3500. We should have said that the mill, instead of the mine, ran but 20 days in the month, and that accounts for falling off in the yield. The Cleveland is a new mine, and is as yet being worked on a small scale. When the owners get everything in proper shape for working the mine the returns will largely increase.

Siskiyou.

SCOTT BAR.—*Cor. Yreka Union*, May 8: The latest excitement is the rich quartz lead on south fork of Mill creek, which, if it continues will make the owners rich. Peter Hansen has started a new tunnel in his Skunk hill mine. Mr. Owen Williams and Harlow Crawford have started up operations in their mine.

Trinity.

NEW RIVER.—*Eureka Times-Telephone*, May 8: Major Tonn, of New River, is en route to San

Francisco. He has purchased the interest of Ladd & Clements in the Hunter and Hoocheney claims, and intends on his arrival in the city to order a fine quartz mill with all the necessary paraphernalia, and have the same sent there immediately. He speaks very encouragingly of the mines, and is of the opinion that New River will make a good showing this summer. There are not many men in the camp just now, but considerable work is being done.

QUARTZ IN HAY FORK.—*Trinity Journal*, May 8: Messrs. Carter, Vodge, Dedrick and Thompson have built an arastra at the mouth of Big creek, Hay Fork valley, and are now doing their first crushing of quartz from their mine in that vicinity. So far they have several "stringers" of from two to ten inches in width, from which one man can easily get enough rock to keep the arastra running. We hope to hear that a satisfactory cleanup has been made soon. The water supply for hydraulic mining is holding out remarkably well, late rains serving to increase the supply. The present season is the best for many years, and a largely increased production of gold dust will result.

NEVADA.

Washoe District.

SIERRA NEVADA.—*Enterprise*, May 9: On the 520 level west crosscut No. 2 has been advanced 39 feet; total length, 466 feet. This crosscut still continues in a hard quartzite and porphyry formation with a little seepage water.

CON. CALIFORNIA AND VIRGINIA.—On the 1400 level the drift running southwest from the west drift has been extended 47 feet; total length, 801 feet. During last week 1045 tons and 1700 pounds of ore were shipped to the Morgan mill, and 1436 tons and 495 pounds to the Eureka mill. The average value of the ore milled during the week, according to assays from battery samples, was \$13.38 per ton for that crushed at the Morgan mill, and \$12.58 for that crushed at the Eureka mill. During the week bullion valued at \$35,187.58 was shipped to the office in San Francisco.

OSBISTON SHAFT.—The water now stands 2,250 feet below the collar of the shaft, and has not been lowered any during the week, as we have been engaged in cutting out a station to place a tank and donkey pump in position. Pending the progress of this work the surrounding ground is being drained down to the water line.

GOULD AND CURRY.—On the 600 level the upraise at the south line has been continued upward 39 feet; total distance above the floor of the drift, 51 feet. From the last set of timbers put in the upraise, east and west crosscuts have been started. The formation is mineralized vein matter.

MEXICAN.—On the 700 level the north bend of the joint Mexican and Union drift, running northwest from the Ophir shaft has been extended 37 feet. Total length, 159 feet. The drift running south, in Mexican ground, from this north west drift has been extended 37 feet; total length, 75 feet.

OPHIR.—On the 400 level east crosscut No. 3 running from the north drift from the old Mexican shaft has been extended 20 feet; total length, 53 feet. A west crosscut, No. 6, was started from this north drift and advanced 40 feet.

UNION CONSOLIDATED.—On the 5000 level are removing air-pipe, car-tracks and timbers from east crosscut No. 2.

Bernice District.

MILL RUNNING.—*Reese River Revue*, May 8: At Bernice the mill is running on ore from Hoyt's mine. Nothing is being done on the Williams property, although they expect to start July 1st. Mr. Williams is now shearing his sheep and looking after ranch matters, the low prices of bullion placing mining to him in the category of secondary affairs. Mr. Coruthers goes from here to Ophir on Monday, having just returned from the East, where he had taken 10 or 12 tons of ore for the purpose of reduction. Mr. Triplett brings to town specimens of blossom rock carrying free gold in abundance, which he found in the neighborhood of Hot Springs.

Columbus District.

MT. DIABLO.—*Candelaria True Fissure*, May 8: The north crosscut from the west drift on the 6th level is in 265 feet. The north crosscut from the east drift on this level is in 21 feet. The stope between the 5th and 6th levels shows a small amount of ore of fair grade. The stope above the east drift on the 5th level shows but a small streak of ore. The intermediate stope between the 4th and 5th levels look well and are giving some ore of fair grade. Considerable \$50 ore is being taken from the west drift on the 4th level. The intermediate between the 3d and 4th levels near the No. 2 winze shows 2½ feet of \$60 ore. We have a bunch of \$50 ore below the east drift on the 3d level that looks promising.

HOLMES.—In the 8th level stope we are still working in the ledge. This stope is not as large as it has been and does not produce as much ore. In the 8th level west drift, near the winze sunk by old General Thomas Company, we are stopping some good ore. This is a nice looking bunch of ore, but we cannot tell how extensive it is as but little work has been done at this point. In the winze from the 8th to connect with the 10th we are stopping. The ledge at this point looks well. In the General Thomas or 11th level we are running east. The ground is exceedingly favorable. At a short distance west of the present face of this drift we started a raise. It is now up about 40 feet. We have a nice prospect in this raise. The sulphuret winze looks well and is producing well. The hot stope has improved very much during the past week. We are getting some good ore from this stope. The stope 60 feet east of last turntable, 1st shaft level, is steadily improving. The stope 50 feet below 1st shaft level, and directly under the last mentioned ore body, is still producing well. At point 6 we are taking out some good ore.

Cottonwood District.

COBALT AND NICKEL.—*Reese River Revue*, May 8: G. T. Coruthers is in with Supt. Triplett, from Cottonwood, and speaks very highly of the cobalt and nickel mines of that district. Mr. Coruthers explains the compound term by saying that the majority of the mines carry both metals, but in some cases is by itself. Among those handling properties of this class is Lou Hanchett, who is now figuring for the sale of the Belle property, hav-

ing just returned from the East whither he had gone with a carload of ore.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, May 8: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Eureka Con. work.—Marguerita mine, 1 ton; Evelin, 1; Dunderberg, 32½; Jackson, 29; Evans, 2½; Baker and Clow, 2. To the Richmond works.—Banner mine, 5 tons; Mohawk, 4; Bullwhacker, 4; Continental, 7½; Jones, 2½; Hamburg, 17; Geddes and Bertrand, 17½; Eldorado and Lemon, 3; Jackson, 12; Senator Beck and Republic, 5; Union and Charleston, 1.

Pahranaug District.

"THE INDIAN RACKET."—*Pioche Record*, May 7: Last week some quartz, showing a liberal quantity of gold, was sent to town from Pahranaug. The quartz was said to have been brought there by an Indian, who was afterwards followed, and the place discovered, about 80 miles from Hiko. A four-horse team and several ranchers started for the Breifogel country, where the Breifogel ledge had been found to a dead certainty, and where they were going to load up with gold, return home and remain idle the remainder of their days. They got within forty miles of the place with their team, and being unable to get any farther with the wagon, they all returned home, with a small piece of copper-stained metal. The gold quartz showed the gold very freely, and from whence it came we know not, but this Indian racket is getting to be too ancient. We have lost confidence in it.

Pennsylvania District.

MOVING ALONG WELL.—*Pioche Record*, May 7: Affairs in this district are moving along nicely. Assessor McFadden, who took a trip there, says the mill is doing good work and turning out bullion rapidly. The mill is not of sufficient capacity, being only a five-stamp. The ledge in the mine is three and a half feet wide, and is taken out and shipped to mill without sorting. It has been satisfactorily demonstrated to those interested that it is a good paying proposition. Mr. Barton certainly deserves success.

Tuscarora District.

GRAND PRIZE.—*Times-Review*, May 6: The north drift from east crosscut in the 200-foot level extended 27 feet during the week, and east crosscut extended 11 feet. Stopes not producing much ore. Mill has been started up to work what ore is on hand.

NAVAJO.—North drift on the east vein from No. 5 crosscut, 350 foot level, has been extended seven feet.

BEILE ISLE.—North drift from east crosscut No. 1, 450-foot level, has been extended 16 feet.

Yankee Blade District.

AN OLD CAMP.—*Virginia Enterprise*, May 7: This old mining district, situated three or four miles north of Austin, in Lander county, was quite noted in the early history of the Reese River mining excitement, twenty years ago, but it has since fallen into comparative obscurity. There are only about half a dozen mines in the district now being practically worked, yet the ore extracted is of the rich antimonial silver character, worth from \$300 to \$3,000 or more per ton. The veins are narrow, like those of Austin, from two to ten inches thick, but at the depth of 300 feet or less a large amount of water is encountered, the drainage of which is too costly under present existing arrangements. At some future time some company of capitalists will sink a deep shaft and put in a big Cornish pump which will drain the whole basin, giving ample access to all of the many small rich ledges. Yankee Blade will then be worked to advantage and yield a goodly number of silver bricks daily. It is one of the many districts in this State which are waiting for capital to develop and bring out their resources properly. The *Austin Reville* says: At last the efforts persistently made in the Yankee Blade district to uncover the ore bodies believed to exist there seem upon the eve of fulfillment. David Todd, who has grown gray whacking at these rocks, has struck it big on the western slope, and now has exposed to view at a depth of 70 feet a body of mineral two and a half feet thick which will go 600 ounces to the ton.

ARIZONA.

SANTA RITA PLACERS.—*Tucson Citizen*, May 8: When the great placer mines of the Santa Rita mountains are worked in systematic manner by associated capital it is believed that an enormous amount of gold will be brought out from its hidden places to do service for mankind. The development of the water supply for hydraulic mining is the first requisite of the proper working of the mines and there is a strong probability that properly directed enterprise will secure the desired liquid in sufficient quantities not only for mining purposes, but for irrigating agricultural lands through the proper storage of the waste water.

COLORADO.

LAKE COUNTY MINES.—*Leadville Herald Democrat*: The new Pittsburg property during the first three months of the current year yielded \$230 worth of ore. The Amity lode, controlled by Geo. O. Keeler, and situated on the west side of the Arkansas river, has recently shipped some very fine ore to the American smelting works. The developments from the McHarg shaft on the Morning Star now show 10 ft. of fine sand ore. The working force of the mine has been increased during the past sixty days, and the pay-roll now contains about 50 names, while the lessees employ about 75 men. Excellent progress is being made in the placing of the new \$10,000 hoisting and pumping plant on the Adams shaft, on a Yankee hill. Operations will be resumed with a full force of miners at the Brookland shaft, next Sunday night. The pumping plant in this shaft is now in the best possible condition. The St. Louis parties who recently purchased the Katy and Midnight lodes, on Little Ella Hill, are losing no time in putting their properties in a producing condition. Since the purchase, which was made less than a fortnight ago, they have erected a shaft-house, and to-day a hoisting engine was shipped from Denver for the Katy mine. The La Plata Mining and Smelting Company, during the first half of March, received 400 tons of ore from the mine of the company, and 1900 tons of other sources. It smelted 2000 tons of ore, and produced

200 tons of bullion, containing about 30,000 ounces of silver. During February, the company received 750 tons of ore from its mines, and purchased 2850 tons. The amount smelted aggregated 3400 tons, producing 374 tons of bullion, containing 60,000 ounces of silver. The La Plata smelter has been compelled to close down, being unable to secure the particular ores required to make economical smelting charges. Several other establishments have also reduced the number of furnaces in blast, being unable to secure ores from the mines with which they have contracts, on account of the bad roads. The Pueblo smelter is also suffering on the same account.

DAKOTA.

TIN MINES.—*Cor. Denver Tribune-Republican*, May 8: The Etta Tin mining company of the Black Hills in Dakota are now running their extensive reduction works night and day, employing a large number of men in mining the ore and running the works, producing concentrated tin ore that assays 50 per cent metallic tin, and their monthly shipments of these concentrates average \$40,000 in value. Mr. Robert A. Little of Detroit and Mr. James Campbell of Chicago have purchased within the past two weeks nine claims on tin ore veins, paying \$50,000 for them, and the deepest work done on any of these claims was 35 feet, showing that these claims are very valuable. Parties from the East have lately purchased from Moore and Blackmore several claims in Warren Gulch, seven miles west of Custer, for \$45,000, and sales of single claims are being made nearly every day of from \$1,000 to \$5,000 per claim. Parties from Scranton, Pennsylvania, have purchased claims and are now erecting works for the reduction of the ore, and the time is not far off when the Black Hills of Dakota will be shipping tin pigs by the ton to the different markets of the United States, thereby adding one more very valuable mineral resource to the many that we can boast of now here in the West.

IDAHO.

SOUTH SIDE NOTES.—*Coeur d'Alene Record*, May 5: The Miller claim is yielding well. One hundred and seventy-six ounces were taken from the Myrtle claim last week. Will Hiren has gone to Spokane Falls to attend the spring and summer terms of the business college. Although both Myrtle and Delta are seemingly very quiet, there is a large amount of work going on in and near both places. Buzzard & Co. have nearly finished cleaning bed-rock on the Montana Bar claim after three weeks' pining. They appear to be well satisfied with results so far obtained. Commissioner Human issued warrants to a number of road men Saturday who have completed their contracts. Most of them have been purchased at the bank, the highest market price being paid. Recent promising quartz discoveries have considerably strengthened the belief which many have held for some time that the South Side will yet compare favorably with other sections of the Coeur d'Alene in the production of precious metals from quartz. Jake Herdier & Co. have purchased Tom Heaney's and J. H. McCaulay's interest in the three claims in Trail gulch, above the ground owned by the Nickerson brothers. It is good ground and will continue to be worked to advantage under the new management. Booth & Ashman, who have valuable placer ground in Potosi gulch, and have been pining for several weeks past, have commenced cleaning bed-rock. If we may judge from what the claim has already produced we may expect soon to learn of an exceptionally fine clean-up. Three hundred and twenty-eight ounces of gold were bought at the Delta bank last week, one hundred and seventy-six ounces coming from the Myrtle claim, the bonanza placer property of Trail creek. At \$16 an ounce Banker Atchison must have paid out \$5,248 in exchange for the precious yellow.

HEAVY SHIPMENTS.—*Wood River Times*, May 5: During the past few days the ore which accumulated at the Idahoan mine during the few weeks of impassable roads has been literally pouring into Hailey, where it is sampled and shipped. Last Saturday 80,000 pounds were received; yesterday, 60,000 pounds; to-day, about 55,000 pounds. This will continue for some days, as there is an accumulation of over half a million pounds of ore at the mine which Superintendent Havens intends to market at once, in order to get it out of the way, and permit him to continue his extensive operations unobstructedly.

FROM SMOKY.—George Montgomery called to-day. He tells the *Times* that Smoky is steadily coming to the front. All the mines are being worked or preparations are being made to work them. The Carrie Leonard is a splendid property. A large body of rich ore was struck in it last Thursday.

MONTANA.

AROUND HELENA.—*Independent*, May 6: The mining boom in the territory tributary to Helena is being inaugurated early in the season. The properties already developed are being worked with rich results, and new locations are being made in various districts, while properties in all directions are passing into paying development, and will soon be paying tribute to Helena, whose railway system is reaching out to grasp the business. Work on the Mountain Queen, near the head of Clancy creek, will be commenced this week by drilling a tunnel running in on the vein near the base of the mountain. Work is being pushed vigorously on the Consolidated Red Mountain tunnel with fine indications. Results from the astrata run on gold ore from the Lexington Chief vein are very satisfactory to the owners. A ten-foot gold bearing ore vein is reported from the Cora, in the McClellan district. About three tons of gold ore per day are being taken out of the Grant mine, located about seven miles southeast of Helena, and if immediate future developments continue as promising as the past, a three-stamp mill will be put in early this season. The mining outlook was never so promising as now.

THE COLUSA.—*Butte Miner*, May 8: Manager Raunheim is constantly opening up new bodies of ore. Developments are continuing on a large scale, but no ore will be hoisted for the present. Connection with the works of the Liquidator mine (recently acquired by the Montana Copper Company) was made during the past week. The ore bodies in the Liquidator mine are very large and of an excellent quality.

THE GOLDEN RULE.—This mine is situated west of the Lexington, and is producing some fine ore.

It is owned by Col. Estes *et al.*, who have a large force of men constantly extracting ore. It was reported that a large body of ore had been exposed in the east drift on the lower level, and orders were given to crosscut on the hanging wall in the west drift.

THE PARROT.—This mine is making its usual shipments of over 300 tons of high grade copper ore, which keep their large smelter supplied. The mine has produced more ore than any of the surrounding properties. Superintendent Tibbey has the mine worked systematically.

THE MOUNTAIN CHIEF.—This mine has lately made several additions to its hoisting capacity, and is enabled now to ship 60 tons of high grade ore a day which is sampled at the Montana Copper Company's Works.

THE WANDERER.—This mine is owned by C. J. McSherry *et al.* The shaft is now down about 140 feet, and it is expected that at the depth of 160 feet a crosscut will be run in about 25 feet to cut the lode.

THE NORTH STAR.—This mine is owned by Dr. Mussigbrod *et al.* The company is now making preparations to place new hoisting works on the mine.

OREGON.

RICH STRIKE.—*Bedrock Democrat*, May 3: Only one week since H. P. Nitcher and partner, the former porter at the store of J. Durkheimer, left this city on foot, lugging their camping outfit and miner's tools, on a prospecting tour, and, wending their way to the west of the city in the vicinity of the snow-capped peaks so plainly visible from this city, their efforts were rewarded a few days ago by their discovering the long-looked-for extension of the "Tom Paine" mine, which has always been noted for its great richness. The parties came to town yesterday to properly locate the same and make preparations for the working of the mine. We were shown a sample of the ore and must say it is marvelously rich, the gold cropping out all over the rock. We would not be surprised if they had struck a "pocket" that perhaps might equal the \$10,000 pocket, once struck in the parent vein of the "Tom Paine."

UTAH.

ALTA.—*Cor. Salt Lake Tribune*, May 7: The Frederick is working but few men, owing to the want of coal. Superintendent Harkness seemed to be much pleased with the work performed in the Frederick, last season, and the general outlook of the Frederick and Crown Prince Mining Company's property, and he is anxiously waiting for the opening of the road in order to ship his coal and start the machinery again and increase the present force of men. The Flagstaff mine, which has been lying idle for years, started again last summer, under the management of Professor Vincent, who is now in England. Dr. Bredemeyer, who is here now on his tour of inspection, is acting manager during the absence of Professor Vincent. This mine has been running all last winter, and is still running under the foremanship of Mr. John Bright and a force of twelve men. The seventh level is in forty feet; twenty-three feet further will make connection with the winze sunk in the large body of iron ore. The main tunnel is in ninety feet. The Vallejo mine is looking fine. There are at present in the mine about 300 tons of ore ready for shipment and a large body in sight. I was informed a few days since that the foreman, Mr. Gundison, will have to stop the extraction of ore on account of surface water. The Vallejo mine has been doing well under the able management of Charles Reed. Mr. Miller, one of the contractors of the Flagstaff tunnel, returned here on the 21st of April with two miners, in the place of the unfortunate Butterwood and McDonald. The contract is for 300 feet. They have run up to this morning 80 feet, and he is doing his utmost to forward the work with all possible speed. The New Emma is still laying idle for the want of coal. There is a small supply of coal on hand, but Superintendent Cullen don't want to start the mine too early for fear the supply will be exhausted before the tramway is open.

REVIEW.—*Salt Lake Tribune*, May 7: The bullion receipts in this city for the week ending May 5th, inclusive, amounted to \$123,776.49; ore, \$28,327.01; a total of \$152,103.50. The previous week the receipts were \$175,938.17, of which \$159,880.18 was bullion and \$16,057.99 was ore. The output of the Ontario for the week ending May 7th, 1886, was 17,096.38 ounces of bullion and \$13,116.72 of ore. For April, 1886, 276 ounces bullion and \$1,408 bullion slugs. The output for the four months of the present year foots up \$622,657.99, reckoning silver as closely as it can be reckoned on the fluctuating market. From this two regular monthly dividends of \$75,000 each, or \$300,000, have been declared and paid. The roads are improving at the Park, and ore shipments have been begun from both the Ontario and the Daly. The product of the Daly for the week was eight bars of bullion, 11,696.13 ounces; for April, 43,155.68 ounces; total for this year, \$171,727.75, including ore sales, which have been stopped for a month by bad roads, but will now be resumed. Ore shipments have begun from the Cave mine, Beaver county. The base bullion receipts for the week amounted to \$12,550; fine bars, \$17,096. The Hanauer smelter product for the week was \$30,685; that of the Germania, twelve cars, \$28,629.16; of the Pascoe, \$2,240—a large total for the smelters. The Stormont sent up \$3,890 in silver bars during the week. Ore receipts were: Queen of the Hills, \$4,770; silver and lead ores, \$7,950; lead and silver, \$13,607.01.

THE EMMA MINR.—A London cable received yesterday by Mr. Cullens, given in last night's *Democrat*, directs him to resume operations at once on the Emma mine at Cottonwood, and work will be commenced immediately and vigorously prosecuted during the season. Operations were suspended last December on account of dangerous snow-slides. This celebrated mine has already produced upwards of \$7,500,000, and as yet hardly prospected. The vein is from 200 to 300 feet in width, and there is every reason to believe that the former yield will prove but a bagatelle to the future output. The mine is in an excellent condition for working. The tunnel which is 1740 feet in length, taps the vein at a depth of 750 feet, and at the end a shaft has been sunk 225 feet. It will require four or five days to pump out the water, when drifting at the second level and sinking of the shaft will be commenced.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 262 Market St., S. F.

FOR WEEK ENDING MAY 4, 1886.

341,216.—ROAD-CART—M. L. Bergman, Buena Vista, Ogn.
341,091.—DISINFECTANT—A. P. Bouton, S. F.
341,099.—AIR COMPRESSOR—Geo. E. Dow, S. F.
341,323.—CIGAR—E. Ehlin, S. F.
341,001.—FOUNTAIN PEN—E. J. Hall, S. F.
341,032.—HORSE BOOT—J. A. McKerron, S. F.
341,049.—PICTURE MOLDING MACHINE—Samuel A. Perry, S. F.
341,429.—PAPER CURRENCY—I. M. Phelps, Shastat, Cal.
341,165.—CONVERTIBLE DRILL PRESS—L. H. Pierson, S. F.
341,055.—SAW GUIDE—J. A. Rolb, San Jose, Cal.
341,350.—PENHOLDER—S. A. Rogers, Austin, W. T.
341,056.—COPYING PRESS—Samuel & Breidenstein, S. F.
341,292.—CAR COUPLING—A. W. Van Dorston, Portland, Ogn.
341,297.—ENVELOPE—F. R. White, S. F.
341,121.—GRAIN SEPARATOR—David Young, Stockton, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Mining Share Market.

There has been quite an active market for mining shares during the week, with advancing prices. Our stock tables show what the fluctuations have been. The Comstocks have advanced from five to twenty cents per share.

The Young America Mining Co., of Sierra county, Cal., paid a dividend of four cents per share, or \$20,000 last month. This makes \$50,000 to date.

The Elk Horn Mining Co., of Montana, paid its twenty-second dividend on the 30th ult., amounting to \$5000, making \$115,000 to date.

The Mary Murphy Mining Co. has recently paid its first dividend of five per cent. The mine is in Chaffee county, Colorado.

The bullion shipments from the Calico district in San Bernardino county from January 1st to April 18th amounted to \$2,207,000.

The assessment of the Hale and Norcross levied this week is number 90.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Silver King, May 8, \$17,000; Alice, 6, \$27,200; Oro Grande mill, 9, \$5825; Odessa mill, 9, \$12,000; Barber's mill, 8, \$6000; Mt. Diablo, 6, \$4447; Alice, 4, \$14,608; Hanauer, 4, \$7490; Pascoe, 4, \$2240; Germania, 4, \$9066; Hanauer, 5, \$5455; Stormont, 5, \$3890; Queen of the Hills, 5, \$1060; Germania, 6, \$4366; Alice, 6, \$14,078; Germania, 7, \$4335; Hanauer, 7, \$8530; Stormont, 7, \$1820; Alice, 8, \$13,136. At Salt Lake, Wells Fargo & Co. received in bullion last week \$29,646; McCormick & Co. \$49,535; T. R. Jones & Co. \$44,236; and Union National bank \$28,666. The banks of this city report the receipt for the week ending May 5th, inclusive, of \$123,776.49 in bullion and \$28,327.01 in ore, a total \$152,103.50. Young America (for April), \$27,620; Cleveland, May 8, \$3500; Con. Virginia & California, 8, \$35,137.

New York Metal Market.

Telegraphic advices dated May 13th, give the following New York prices:

BORAX—6½% @ 7½%
BAR SILVER—\$100½ per oz.
COPPER-LAKE—\$11.37½
IRON—No. 1, \$17 @ 18.50; No. 2, \$16 @ 16.50.
LEAD—\$4.85 @ 4.95.
QUICKSILVER—43 @ 43½¢ lb.
The following is the latest from the "New York Metal Market Report":
COPPER—Neglected; Lake offered at 11.30c. Transferable Notices (Lake) offered at 11.30c; Transferable Notices (Chili Bars) offered at 4.40c.
LEAD—Quiet and weak at 4.70 @ 4.80c. Transferable Notices (Domestic) issued at 4.75.
SPELTER—Steady at 4.45 @ 4.65c. Transferable Notices (Domestic) issued at 4.55c.
TIN—More active at 20.80 @ 20.85c. Transferable Notices issued at 20.75c.
TIN PLATE—Dull. Transferable Notices issued at 4.35.
IRON CERTIFICATES—Dull and nominal. Transferable notices (May delivery) issued at 17.
SILVER—New York, 100½ per oz. London, 45½d.
MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ 19.50; No. 2, \$16.50 @ 17.50; Grey Forge, \$15.50 @ 17.00. Hudson River, Grade No. 1, \$18 @ 19; No. 2, \$16.50 @ 17.50; Grey Forge \$15.50 @ 16.50. Southern, Grade No. 1, \$18.50 @ 19; No. 2, \$17 @ 17.50; Grey Forge \$16 @ 17.
Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, May 7th, \$20.85 @ 20.95; Billiton Tin, \$21.05 @ 21.25; Banca Tin, \$21.20 @ 21.35; Baltimore Copper, \$9.90 @ 10.15; Orford Copper, \$9.90 @ 10.15; P. S. C. Copper, \$9.90 @ 10.40; Foreign Lead, \$4.70 @ 4.85; Foreign Spelter, 4½ @ 5½.

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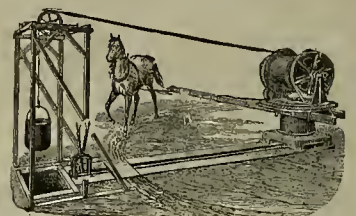
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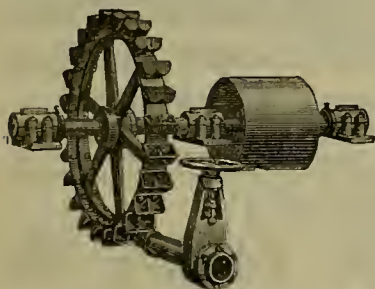
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(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

Mining Shareholders' Directory.

Compiled every Thursday from advertisements in Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Belmont M Co.	Nevada.	4.	10.	Apr 30.	June 5.	June 23.	J. W. Pew.	310 Pine St
Baker David M Co.	California.	11.	25.	May 3.	June 7.	June 23.	D. M. Kent.	330 Pine St
Con Amador M Co.	California.	12.	25.	Apr 23.	May 20.	June 16.	F. B. Latham.	327 Pine St
Crocker M Co.	Arizona.	2.	20.	Mar 10.	Apr 13.	May 21.	A. Waterman.	309 Montgomery St
Champion M Co.	California.	21.	10.	Apr 13.	May 20.	June 6.	T. Wetzel.	522 Montgomery St
Eureka Con M Co.	Nevada.	9.	1.00.	Apr 20.	May 31.	June 22.	E. H. Willson.	328 Montgomery St
Grand Prize M Co.	Nevada.	18.	40.	Apr 9.	May 17.	June 7.	E. R. Grayson.	327 Pine St
Gold Point M Co.	California.	9.	01.	Mar 20.	Apr 24.	May 15.	A. B. Brady.	Grass Valley
Gould & Curry M Co.	Nevada.	52.	40.	Mar 27.	Apr 30.	May 25.	A. K. Darbrow.	309 Montgomery St
Hale & Norcross M Co.	Nevada.	90.	50.	May 12.	June 14.	July 7.	J. F. Lightner.	309 Montgomery St
Lucky Hill Con M Co.	Nevada.	3.	05.	Apr 5.	June 7.	July 7.	F. D. Black.	27 Ellis St
Mayflower Gravel M Co.	California.	30.	25.	Apr 30.	June 6.	June 25.	J. Moritz.	328 Montgomery St
McMillen S M Co.	Arizona.	6.	20.	Apr 9.	May 14.	June 8.	J. Moritz.	328 Montgomery St
Martin White M Co.	Nevada.	21.	25.	Mar 16.	Apr 20.	May 20.	J. J. Scoville.	309 Montgomery St
Manhattan M Co.	California.	9.	01.	Mar 20.	Apr 24.	May 15.	A. B. Brady.	Grass Valley
North Banner Con M Co.	California.	11.	11.	Apr 3.	May 6.	May 24.	J. J. Mitchell.	Grass Valley
Pomona Valley M Co.	California.	4.	01.	Mar 22.	Apr 4.	May 16.	M. Byrne.	Grass Valley
Potosi M Co.	Nevada.	23.	30.	Apr 16.	May 20.	June 9.	C. E. Elliot.	309 Montgomery St
Peer M Co.	Arizona.	5.	10.	Apr 13.	May 20.	June 16.	A. Waterman.	309 Montgomery St
Santa Anita M & M Co.	California.	9.	02.	Mar 31.	Apr 27.	May 17.	J. M. Buntington.	309 Montgomery St
Silver Hill M Co.	Nevada.	23.	25.	Apr 19.	May 26.	June 18.	W. E. Dean.	309 Montgomery St
Union Con M Co.	Nevada.	33.	25.	Apr 19.	May 26.	June 22.	J. M. Buntington.	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Bismark M Co.	Nevada.	A. K. Darbrow.	309 Montgomery St.	Annual.	May 19

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Caladonia M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	30.	Feb 23
Con Virginia & California M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	30.	Feb 23
Derbec Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Feb 9
Holmes M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Mar 20
Mono M Co.	California.	G. W. Sessions.	333 Montgomery St.	25.	Mar 10
Manhattan S M Co.	Nevada.	John Stockert.	415 California St.	25.	Feb 17
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar 15
Young America M Co.	California.			40.	Apr 20

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Apr. 22.	WEEK ENDING Apr. 29.	WEEK ENDING May 6.	WEEK ENDING May 13.
Alpha.	.55	.70	.60	.85
Alta.	.25	.25	.20	.25
Andes.	.25	.19	.20	.30
Argenta.	.10	.10	.10	.10
Belcher.	1.10	1.01	1.11	1.10
Belding.	1.11	1.15	1.05	1.05
Belle & Belcher.	1.15	1.40	1.05	1.05
Bullion.	.35	.45	.40	.50
Bonanza King.	.10	.10	.10	.10
Belle Isle.	1.05	1.15	1.10	1.25
Bodie Con.	1.05	1.15	1.10	1.25
Bodie Tunnel.	.10	.10	.10	.15
Bulwer.	.61	.80	.70	.60
California.	2.00	2.10	2.20	2.00
Challenge.	.10	.10	.10	.10
Champion.	.65	.80	.70	.65
Chollar.	.10	1.00	1.05	1.25
Confidence.	.10	1.00	1.05	1.25
Con. Imperial.	2.10	2.10	2.00	1.50
Con. Virginia.	.20	.30	.30	.40
Con. Pacific.	.95	.85	.90	.90
Crown Point.	.10	.10	.10	.10
Day.	1.35	2.25	1.10	1.25
Eureka.	1.35	2.25	1.10	1.25
Eureka Tunnel.	.15	.10	.10	.15
Exchange.	.15	.10	.10	.15
Grand Prize.	.65	.75	.65	.95
Gould & Curry.	.65	.75	.65	.95
Goodspeed.	.10	.10	.10	.10
Hale & Norcross.	3.50	4.90	2.70	3.10
Holmes.	.10	.10	.10	.10
Independence.	.10	.10	.10	.10
Julia.	.10	.10	.10	.10
Justice.	.10	.10	.10	.10
Martin White.	2.20	2.25	2.30	2.50
Mono.	.50	.55	.40	.50
Mexican.	.30	.35	.30	.40
Mt. Diablo.	.10	.10	.10	.10
Northern Belle.	.10	.10	.10	.10
Nevada.	.10	.10	.10	.10
North Belle Isle.	.10	.10	.10	.10
Occidental.	.10	.10	.10	.10
Ophir.	.10	.10	.10	.10
Overman.	.10	.10	.10	.10
Potosi.	.10	.10	.10	.10
Pinal Con.	1.10	1.20	.95	1.00
Savage.	.10	.10	.10	.10
Seg. Belcher.	.10	.10	.10	.10
Sierra Nevada.	.10	.10	.10	.10
Silver Hill.	.10	.10	.10	.10
Silver King.	.10	.10	.10	.10
Scorpion.	.10	.10	.10	.10
Syndicate.	.10	.10	.10	.10
Union Con.	.30	.35	.25	.25
Utah.	.10	.10	.10	.10
Yellow Jacket.	.65	.70	.60	.75

Sales at San Francisco Stock Exchange.

THURSDAY A. M., May 13.	250	Halo & Nor...	2.05@2.10	
10 Alpha.....	30c	250	Holmes.....	2.40
250 Alta.....	40c	200	Mexican.....	45c
51 B. & Belcher.....	1.05	100	N. Belle Is.....	50c
490 Bodie Con.....	1.65@1.70	100	Mono.....	2.55
350 Bulwer.....	1.90	1400	Nevado.....	55@60c
230 Chollar.....	70c	100	Ophir.....	65c
910 Con Va & Cal.....	1.35	100	Overman.....	30c
100 Con Pacific.....	65c	500	Potosi.....	50c
75 Confidence.....	1.95	500	Savage.....	95c
10 Exchange.....	15c	100	Sierra Nevada.....	45c
20 Eureka Con.....	1.15	200	Silver Hill.....	10c
360 Gould & Curry.....	1.05@1.10	100	Yellow Jacket.....	80c

For Mining Share Market, Bullion Shipments, etc., see page 329.

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No Cure! No Pay!

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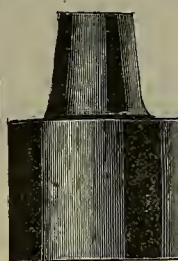
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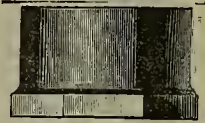
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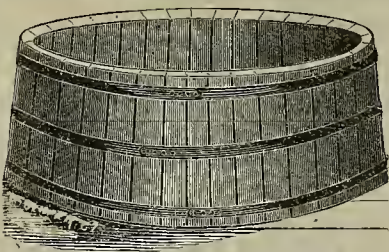
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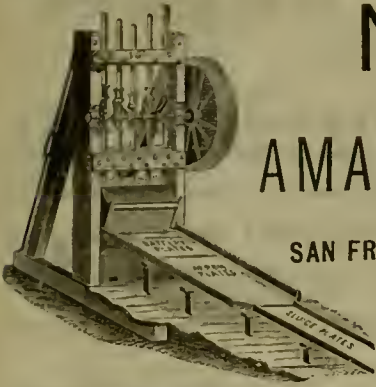
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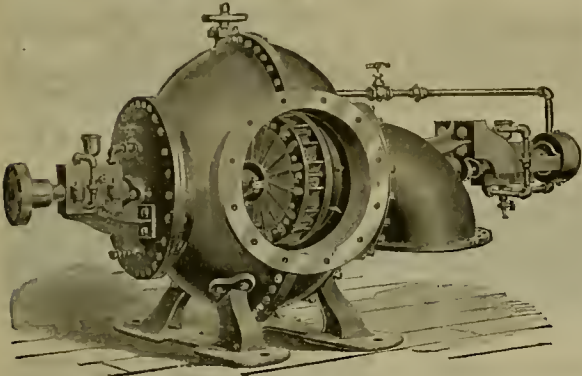
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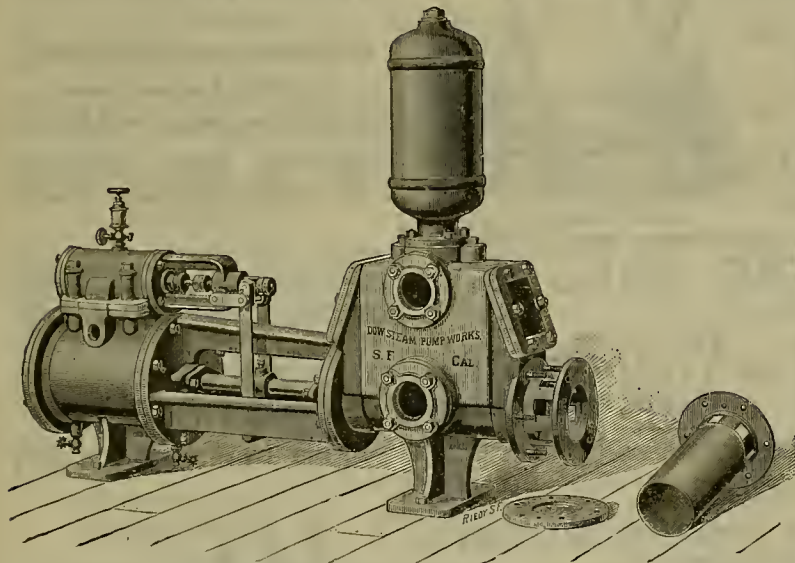


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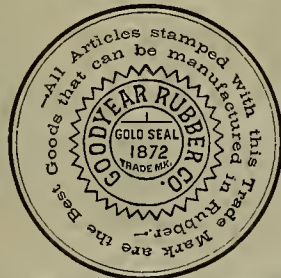
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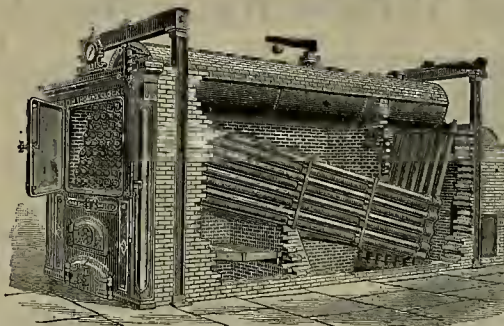
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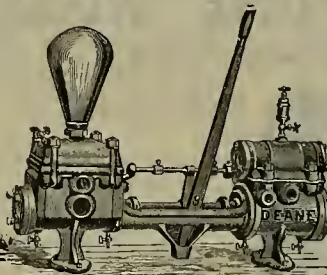
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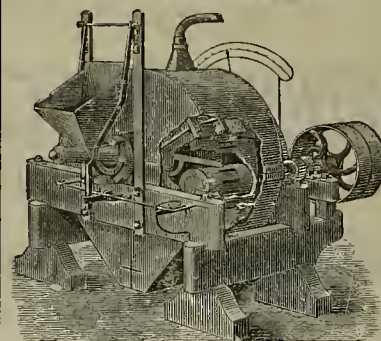
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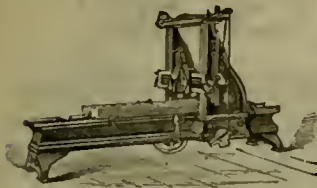
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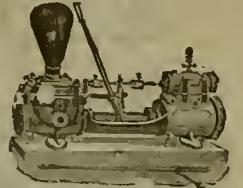


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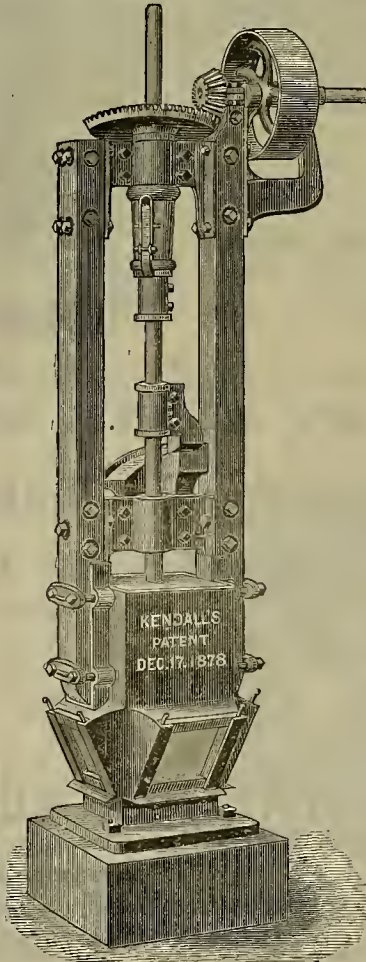
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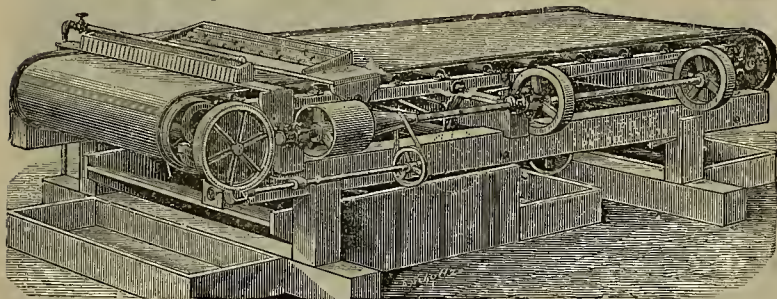
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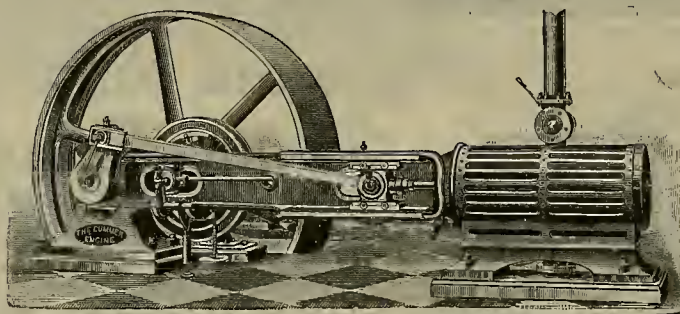
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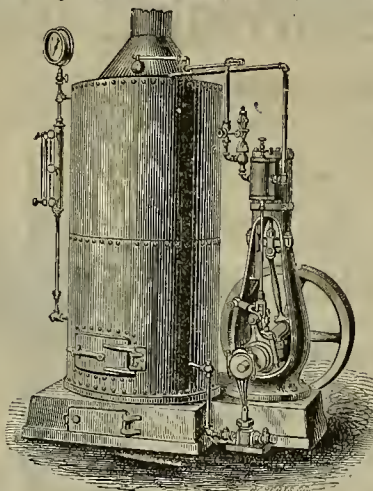
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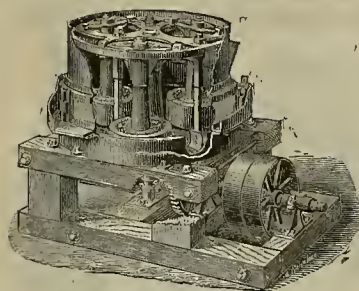
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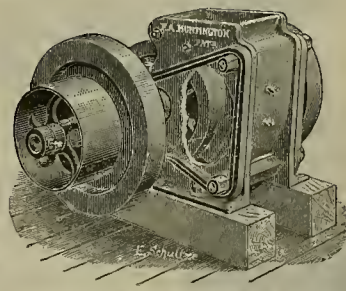
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SAN FRANCISCO, SATURDAY, MAY 22, 1886.

VOLUME LII
Number 21

The Frisbee-Lucop Quartz Mill.

We mentioned last week that a machine for pulverizing quartz, just being introduced on this coast, had been set up and in operation at the Pacific Iron Works, in this city. This is the Frisbee-Lucop mill, which we have since seen in operation. It has been at work in the East for some years, grinding phosphates, but has been improved and adapted more particularly for quartz work. We present herewith engravings of this mill. It is a centrifugal roller mill, in which the rollers revolve on their axis and are carried around in a vertical plane on the inner periphery of a heavy ring of hard steel, set vertically inside of a suitable casing, against which they exert a centrifugal force of 1800 to 2000 pounds each, according to their speed. There are two rollers, which are propelled by cylindrical or curved drivers, as may be preferred, and held in place by a pair of disk plates, which are bolted to the arms on either side. This form of construction allows the rollers to lie loosely in place and to move from the face of the ring toward the shaft, so as to pass over pieces of iron or steel that may accidentally enter the mill. An automatic feed is attached, and every mill is complete and ready for the belt when shipped. The wearing parts, which are the ring, rollers and drivers, weigh altogether about 700 pounds, require no fitting, and are readily replaced when worn out. The

depending upon the number of the screen used or the velocity of the air current, when the latter is used, and there are no tailings to be returned to the mill for regrinding, thereby avoiding the expensive and troublesome elevating and screening machinery necessary where part of

outward through the screens, and discharge the finished product through a chute, which passes downward through the bed-plate, from the casing on each side of the mill, and, for amalgamation, the pulp may drop directly on plates or be conducted to pans. Where the product

hinged to the lower at one side, and is easily raised, so as to give free access to the interior of the mill, for examination and replacing worn parts. A new feature in these mills is attaching a revolving screen of coarse mesh to the shaft inside of the fixed screens, which prevents

any pieces of iron or large pieces of rock from coming in contact with the fine screen, but does not prevent the finished product from passing freely. This revolving screen is entirely unnecessary in quartz or other hard material, and is only used when clay, cement, talc, or some such soft material is ground, when the mill is filled *entirely full* of the rock.

Referring to the cuts, Fig. 1 shows the mill closed; Fig. 2, with upper half of the casing raised, showing the ring in place, one of the disks partially broken away, exposing a portion of one arm, a roller and driver, and also the propeller fans. Fig. 3 is a vertical transverse section through the ring rollers, drivers, arms, etc., fully showing the automatic feed.

The reference letters (Fig. 3) show: A, bed-plate; B, casing; C, C, C, keys which hold the ring, D, in place, and by which it is adjusted to position; D, ring; E, E, arms; F, F, drivers; G, G, rollers; H, opening through which the rock is fed to the mill; J, cam on feed shaft which strikes the tappet, L; K, feed shoe; M, adjustable screw for graduating the feed; N, hand wheel by which the screw, M, is turned; O, suspension rods for K; P, a

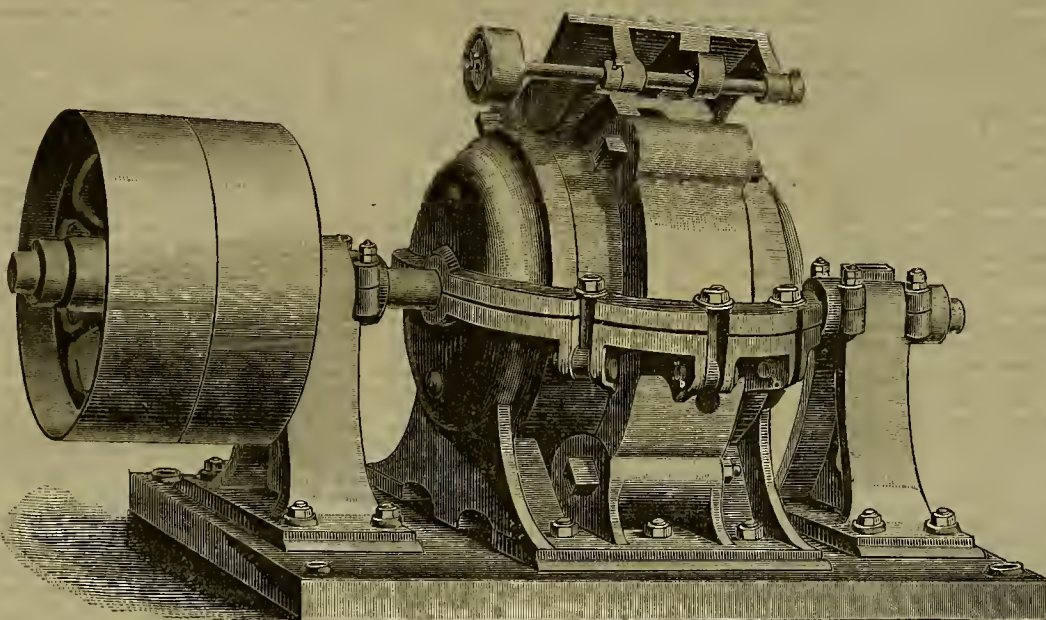


FIG. 1. THE FRISBEE-LUCOP QUARTZ MILL.

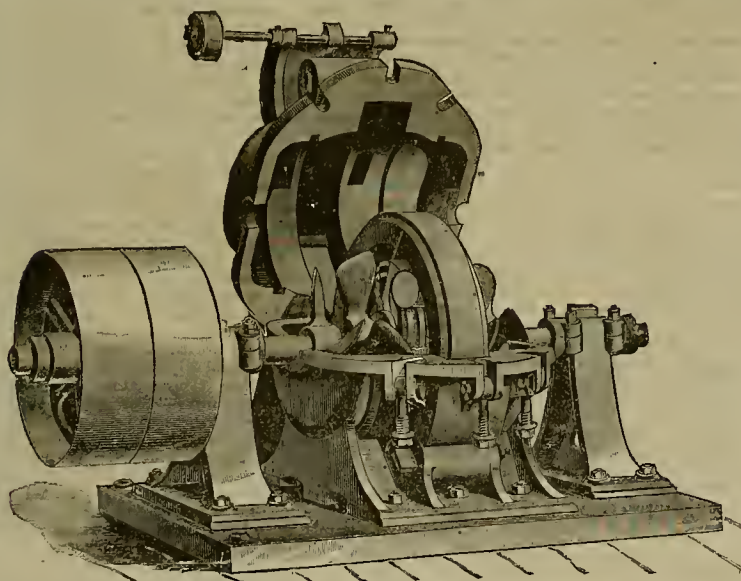


FIG. 2. INTERIOR VIEW OF THE FRISBEE-LUCOP MILL.

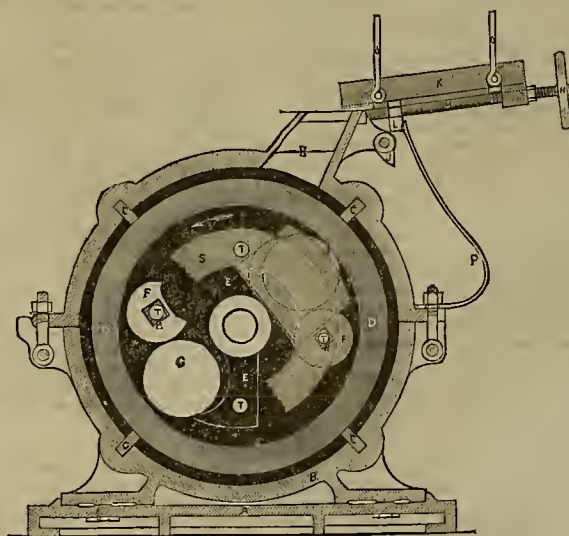


FIG. 3. TRANSVERSE SECTION OF MILL.

amount of wear of these renewable parts depends upon the hardness of the material ground, but it is claimed that the loss will, in any case, be less than in stamp mills on the same substances, as there is no loss by breakage. All substances, of whatever kind, when ground, leave the mill in a finished state, their fineness

which the material, as fed into the mill, is distributed around the inner periphery of the ring, in the path of the rollers, insuring an equal amount of work at every point on the face of the ring.

Outside the screens is another pair of propeller fans, which cause a current of air to pass

fan or other method of causing a current of air to pass through the mill. In this case there are openings in the bottom of the casing for the admission of air. The casing is divided horizontally, and the upper and lower halves are held together by hinged bolts, in slots cut in the flange of each section. The upper half is

spring, which bears against the tappet, L, and throws the feed shoe back to its place after the cam passes the tappet; R, a square projection, fitting square hole in disk plate, by which the cylindrical driver is prevented from turning S, a portion of disk plate T, T, T, holes for (Continued on page 341.)

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Xanthates.—No 2.

[Written for the MINING AND SCIENTIFIC PRESS by C. H. AARON.]

In working up my "new copper assay" I was a little surprised to find that the reaction was different from that which occurs in the cases of some other metals, as nickel and cobalt for example. With copper, whether in ammoniacal solution or as neutral sulphate, chloride, etc., the precipitate is not a homologous of the precipitant; the reaction is not then a simple metathesis.

According to Regnault, potassium xanthate consists of one molecule of potassium oxide and one of xanthic acid. If this copper compound were of similar composition, it would contain rather less than 21 per cent of copper, but it contains very close to 33 per cent, which agrees with the hypothesis that it consists of two molecules of copper oxide and one of xanthic acid, or it might be two of copper dioxide, one of water and one of xanthic acid, and in order to understand the reaction by which it is produced it was necessary to know which.

Not having the means of analyzing such a substance as xanthate, I was at a loss to make the matter out, the more so as nickel and cobalt give compounds containing the correct proportion of metal for homologues of the precipitant. The hypothesis of a hydrate did not strike me at first, nor favorably at last, and the other requires the assumption that two molecules of the precipitant are decomposed for one of the copper salt, and then the question arises, What becomes of the extra one of xanthic acid? I had discovered that it was necessary to wash the copper compound with alcohol in order to remove some substance which volatilized slowly and imperfectly on the water bath, and was not soluble in water, in ammonia, nor in solution of potassa (aqueous), but dissolved in alcohol and was precipitated by dilution, after the manner of oils. This was the key to the problem.

If the copper precipitate, washed with cold water only, be dried with gentle heat, then steeped for a few minutes in alcohol and thrown on a filter, a yellow solution is obtained, which on dilution with water becomes a milk-white emulsion which does not settle in any reasonable time nor form drops when settled, and which passes completely through a filter. If the alcoholic solution be allowed to evaporate spontaneously it leaves oily drops of a yellow color which readily unite. This oily liquid has the smell which characterizes the xanthates; it does not unite directly with potassium hydroxide, but its alcoholic solution forms with that potassium xanthate. Now carbon disulphide would do the latter; it also dissolves in alcohol and forms a milky emulsion on addition of water. But the emulsion of carbon disulphide settles well and soon forms drops; it readily clears by agitation, as pouring from vessel to vessel, or stirring, the disulphide evaporating, and it is doubtful (or rather it is scarcely doubtful) if anything would remain after evaporation of an alcoholic solution of carbon disulphide. The oily liquid mentioned agrees in every observable respect with the xanthic acid obtained by the decomposition of potassium xanthate with hydrochloric acid, as directed by Regnault, that is so far as my observations go, and I have not the slightest doubt that it is xanthic acid. One peculiarity of it is that, although heavier than water, since it sinks when submerged, yet, in washing it, the moment the surface of a drop is uncovered by the water, the drop, or a part of it floats and is with difficulty made to sink again. It is not very volatile though composed of ether and carbon disulphide. Nitric acid, even hot, seems to only partly decompose it, or decomposes it, leaving an oily residue. A portion of it left all night in ammonia was found solid in the morning, though another portion, not so treated remained liquid; it remelted in time after removal of the ammonia.

I conclude that in the precipitation of copper by an alkaline xanthate, two molecules of the precipitant are decomposed for one of the copper salt; that the copper xanthate is a basic salt and that for every molecule of it formed, a molecule of xanthic acid is set free. There is at least one other instance known, perhaps several others, in which a basic salt is formed in presence of an excess of its acid in the free state, yet it is not usual, I believe.

In my book on assaying I have said that the proper color of copper xanthate is mustard yellow. I now find it orange colored. Something of the shade depends on the state of aggregation, and something on the purity of the alcohol used in making the precipitant. It is probable that fuel oil may form a compound similar to a xanthate, and its presence in the alcohol may modify the shade of the product (also its molecular weight).

Silver in ammoniacal solution is precipitated by a soluble xanthate. The reaction is similar to that with nickel, the compound produced containing empirically 46.75 per cent of silver which, allowing for loss in melting and cupelling, is pretty close to theory calling for 47.16 per cent. Silver is also precipitated from its solution as a double hyposulphite.

Lead and bismuth are precipitated by this

reagent, and the precipitates curdle so energetically that they form compact balls, when agitated. I have not ascertained whether the composition agrees with that of copper xanthate or of the nickel compound.

Nickel xanthate dissolves readily in ammonia, less readily in solutions of ammonium salts not in alcohol. Cobalt xanthate is not soluble in ammonia, but dissolves partly in alcohol, forming a green solution and a black residue. The solution is decomposed by water.

All of the heavy metal xanthates which I have examined are readily soluble in solution of potassium cyanide, and more or less so in solution of potassium xanthate. The latter point is important in regard to gravimetric assays with this reagent; great excess of the precipitant must be carefully avoided, the more so as the presence of re-dissolved metal is not indicated by a soluble sulphide. Potassium-xanthate is made by adding carbon disulphide to an alcoholic solution of potassium hydroxide as long as the disulphide dissolves. If the alcohol and disulphide are in great excess of the potassa, a solution of disulphide in alcohol is present, and turbidity is produced by addition of water. The liquid soon clears if agitated. An excess of disulphide remains undissolved at the bottom of the vessel; an excess of alcohol usually does no harm, except that the copper precipitates settle less readily. With "absolute alcohol" and filtering the potassic solution to clear it of potassium-carbonate before adding the disulphide, the solution finally got may be neutral to test paper, but frequently it is slightly alkaline. This is of no importance in the precipitation of an ammoniacal solution of a metal, but must be guarded against when neutral solutions are operated on; even a slight acidity of the metal solution will not always prevent the co-precipitation of oxide with the xanthate, or perhaps an oxyxanthate is formed.

I have found it impossible to precipitate cobalt-xanthate free from zinc, in a faintly acid solution of both, by means of a slightly alkaline solution of potassium-xanthate; even the pressure of acetic acid in great excess, or of other solvents for zinc-xanthate or oxide proved useless, nor is it feasible, short of a complete decomposition of the mixed precipitate, to remove the zinc from the cobalt-xanthate. This piece of knowledge cost me four months' work and a good deal of money when working on my nickel and cobalt assay.

Sodium and calcium form soluble xanthates, and even aluminium, though the latter very slowly. Alcohol, ammonia and carbon disulphide seem to form a volatile ammonium xanthate, having the color and odor of the others, but it cannot be made neutral. In an ammoniacal solution of copper, the ammonium xanthate produces a brown precipitate which soon blackens. In my one experiment with this reagent I found no free xanthic acid in the copper precipitate which nevertheless seems to be a xanthate, having the characteristic odor, especially when calcined, and containing about 33 per cent of copper. The absence of free xanthic acid in the product may have been owing to an excess of alcohol in the precipitant, which kept it in solution.

NOTE.—In the preceding article on xanthates, the types make me say that the electrolytic process is as accurate as, or, in certain circumstances, more so than, that by a xanthate, whereas I said the converse of this. The error of the type consists in saying "which is" in place of "while," as written. Also, for "capacity of execution" read "celerity of execution," again for "sulpho-carbonates" read "sulpho-carbovinates." (Regnault.)

The United States and the Debris.

Representative McKenna has secured the adoption of the following amendment to the River and Harbor bill in the House:

Improving the Sacramento and Feather rivers, California—\$40,000 of the money appropriated heretofore for improving said rivers that may remain unexpended at the end of the fiscal year, for snagging and dredging operations, and for the cost of the proceedings hereafter authorized, the balance of said unexpended money not to be used until the Secretary of War shall be satisfied that hydraulic mining has ceased on said rivers and their tributaries. If he be not so satisfied he shall institute such legal proceedings as may be necessary to prevent the washing, sluicing, damming or discharging detritus, debris or slickens caused by or arising from hydraulic mining into either of said rivers or any of their tributaries, or into the San Joaquin river or any of its tributaries, or to such place from which such detritus, debris or slickens may be liable to be washed by storms or floods into either of said rivers or said tributaries; and he is authorized to use each part of said \$40,000 as may be necessary for said purpose.

LUMBER INTERESTS AT TRUCKEE.—Messrs. Sisson, Crocker & Co. have sold their entire business interests in Truckee to the Truckee Lumber Co. The only exception in the sale being a tract of timber land owned by them, and which will likely be transferred to another mill owner very soon. Mr. Van Arsdale will remain for the present and superintend the affairs of the concern; whether he will remain permanently has not yet been decided. It will be regretted that Sisson, Crocker & Co. have closed their business relations with Truckee, but the purchasers are well known as being live and stirring business men, and it is certain nothing detrimental to Truckee and her business interests will suffer from the change.—*Truckee Republican*.

California Asphaltum.

A Growing Business in Native Asphalt.

A Los Angeles *Express* reporter recently visited the new factory of the Mineral Rock Asphalt Company, and was shown its operations by C. W. Duffy, the superintendent. The building is a wooden frame, 110 feet long by 60 feet wide, and has a driveway the entire length and a storage capacity for 1000 tons of asphalt. There are four brick furnaces for refining the native asphalt. Each furnace has a present capacity of one ton per day, with a possible increase to two tons. There is also a still for the purpose of distilling asphalt oils. The distilled oil is used to mix with the asphalt in the process of refinement, and the residuum is used for burning. The still is arranged for 15 barrels of oil per day from the Puente wells. Besides these brick furnaces there are portable iron furnaces for melting the asphalt on the streets preparatory to laying it down. Mr. Duffy calls them the "smokeless furnaces," and claims them especially as his own invention. An ordinary oil burner is used in each of the portable, smokeless furnaces, which consist of an ordinary sheet-iron cylinder, three feet high and three feet in diameter, with a cone-shaped bottom, apex downward, with a peculiar-shaped opening at the bottom for the introduction of the oil burner. The cauldron is set in above the cone. These smokeless furnaces do away with all the disagreeable odor which is so obnoxious to passersby, when hrea or asphalt are being melted in the usual way.

The Supply.

The asphalt had from which the company gets its supply is near Anaheim, and Mr. Duffy says the company has enough to plaster all Los Angeles county a foot thick, and then have enough surplus to supply all orders from other points. He claims they have millions of tons of it. The supply of asphalt in the world is rather limited. In the East the market is controlled by a monopoly, the Barber company, which has leased the island of Trinidad for 99 years from the English Government, and will not sell to anybody unless it is for pipe-dipping purposes.

Its refinery is at New Orleans. In the minds of the uninformed, hrea and asphalt are considered the same, but Mr. Duffy says they are not so. He showed the reporter specimens of the two, which certainly show a difference. Brea is fully 100 per cent lighter in weight than asphalt, and lacks the consistence of the latter. Mr. Duffy defines hrea as a paraffine deposit, while asphalt is more of a limestone or bituminous rock heavily impregnated with oil. He handed the reporter a specimen of limestone composed almost wholly of sea shells, and said the asphalt comes from them.

The Process of Refining.

Like everything else, is simple enough when understood. The brick furnaces in the factory are all heated by oil burners, especially adapted to them by Mr. Duffy. The native asphalt is put in them and is first treated without oil. After it reaches a certain point that is known by the experienced operator, a proportion of oil is added sufficient to turn it down to a proper consistency for use. It is then drawn off in a liquid form into a bed, and allowed to cool, and is then broken into blocks for shipping. On the street, these blocks of refined asphalt are put into the smokeless furnaces, and different proportions of palzalina, limestone and silica are added, according to the different purposes. This composition is melted and poured out on a concrete foundation in blocks, squares, and other designs. The concrete is composed of Portland cement and gravel, in the usual proportions, from three to six inches thick. The cement foundation is allowed to thoroughly crystallize, after which two and a half inches of the composition of asphalt, limestone and sand, mixed in the proper proportions, are spread over it, and tamped and rolled. Such a pavement on the street will stand the heaviest trucking that any city has. The iron shoes of the horses will not slip, as there is sufficient sand in the asphalt to form a grit. The asphalt does not shrink or crack like brea, but becomes more compact with age. High and low temperature does not affect it. It does not soften in the summer heat nor harden with the winter cold.

Asphalt will also be used for roofing. A layer of asphalt three-sixteenths of an inch thick, on a burlap foundation, can be rolled up like carpet. Nails driven through it do not cause leaks, because the asphalt cloeees tightly around the nail. The danger of fire is no greater than with other roofs, because the asphalt disintegrates under heat rather than burns. The other uses for asphalt are sewer, water and drainage pipes, cellar floors, reservoirs, etc.

The Cost

Varies according to the foundation and thickness of the asphalt. As a general rule asphalt pavements will cost twenty-five per cent less than any other pavement that can be laid down in Los Angeles. About fifteen cents per square foot for sidewalks, and twenty-five cents for streets is a fair price. The roofing will cost about two and a half cents per square foot. The cost of the pavement in the East is 40 cents per square foot.

Just Starting.

The company is just starting in business. About thirty men will be employed in the

factory besides the street men, the miners, officers and agents. The company has incorporated with \$25,000 capital stock, with William Lacy, president, Walter S. Maxwell, secretary, and C. W. Duffy, superintendent. It is their intention to establish agencies East and elsewhere to sell their refined asphalt. The company has a contract with the city to pave one hundred and twenty feet of Spring street, north of Second street, in front of the city hall lot, and twenty-five feet to the center of the street. Work will be commenced on the contract next Monday. The sidewalk on this same front will be widened to fourteen feet, and also paved with asphalt.

No New Thing.

Asphalt pavements are not new. Mr. Duffy laid 100,000 square feet between this post-office and custom house, San Francisco, ten months ago, that is in a better condition now than when laid, because it is more compact. He also laid some for J. J. Haley, the real estate agent of the Southern Pacific company. Washington City has sixteen miles of asphalt pavement. Chicago has six miles; Omaha, eight; St. Louis, six, and so on. It is used largely in Europe. The monopoly of the Barber Company has prevented its general introduction in the East.

Hawthorne District.

Hawthorne mining district, situated twelve miles in a southeasterly direction from the town of Hawthorne, the county seat of Esmeralda county, Nev., continues to create some stir among mining experts. The road from town is a comparatively good one. Nine miles from Hawthorne the road enters a "wash" which runs between two chains of mountains for a distance of eighteen miles, to Garfield. (Farrington Bros' mines and mill.) About two miles from the mouth of the "wash," on the right hand side on the top of a small hill, is the Pamlico mine. This ledge is small, but exceedingly rich, assays obtained going as high as \$4,800 in gold. On the same side and half a mile further on, we encounter the high hill with the Nevada, Ohio, Antony, Mountain King and Keating claims. They are all well-developed. The Nevada has a very well-defined ledge running in a tunnel at a distance of 128 feet and down an incline of thirty feet. The average width is four feet and the average assay \$45. The Ohio, Mountain King and Antony have defined ledges. Next in order comes the Detective, New York, Red Bank and Golden Nugget, all well defined. The Red Bank has a shaft 100 feet deep; the ledge is small, but rich.

At a point three miles from the mouth of the wash (Lake City) the road branches off to Lapanta, a distance of one mile. The Lapanta is situated on the side of a limestone hill that has a black dike (dolorite) running the whole length of the hill. This mine is worked entirely through tunnels and inclines, all connecting with each other, and are fully one-eighth of a mile long from a certain point to the end of the deepest point, a perpendicular depth of 100 feet. The ore is free gold, and exceedingly rich. Twenty-two men are underground, and the stoves increase in size daily. The Lapanta Company own the surrounding claims, viz., the Esmeralda, Alabama, Golden Bullet and Golden Gate. The Esmeralda is the only one developed; it has a shaft 80 feet, with a drift 35 feet long. Ledge matter was encountered, and the work was postponed until the developments in the Lapanta exposed mineral in the Esmeralda. One-quarter of a mile east in a direct line is the Dictator Consolidated. The Mountain Chief and Dictator, adjoining claims, were consolidated and incorporated March 20, 1886, with 100,000 shares. A working capital of 15,000 shares were set aside at 25 cents to be used for developing the property. Five men are here at work. The main shaft is 78 feet deep; the ledge at the top is three feet in width, has increased to ten feet at the present depth. The general average of the whole ledge is \$22 in gold. About \$5000 has been expended in developing this claim, and ore has been encountered in seven different tunnels and shafts. North of the Dictator is the Narrow-gauge, Unknown and several claims owned by J. Moss. West of these are the Deposit, Mayflower, Lapanta Nos. 2 and 3. South of the Dictator is the North Star Consolidated, incorporated recently and including three gold claims. East of this is the Sagebrush, Elsie, May and Norton claims. There are hundreds of monuments all over the country, and everyone has a claim. All that is needed is a mill, and steps are being taken for its construction. Water can be obtained by sinking, and the district will soon prove to be better than was ever claimed for it.—*Reno Gazette*.

C. E. ANTHONY a mining man well-known throughout Grant county, has made the final payment of \$40,000 all told upon the Anderson mine and extensions in the Apache district, N. M. These properties are producing now eight cars of \$100 per ton ore a month, and Mr. Anthony informs a representative of the *Silver City Enterprise* that there is no limit to the shipping ore at present exposed and ready to break in this magnificent property. The ore is a splendid fluxing material and is much sought after by the competing smelters.

Running Tunnels for Quartz.

Tunnels for mining purposes have never been especially successful in Colorado, though they have been frequently constructed, and have been favorite methods of development among the myriads of fresh mining superintendents, or managers as they are called now-a-days, who have cursed this industry in this State. A mania to run a tunnel seems to possess the tenderfeet who dabble in mining and they generally start one, with disastrous results to the treasury of the company which foots the bills. The tenderfoot miner never learns anything from the experience of others. He is an admirable specimen of the genus fool, to which we mostly belong. He is an illustration of the oft told truth that few men will learn from the experience of others.

There is scarcely a mining county in the State which does not have many of these dark and deserted tunnels as illustrations of folly. Some of them cost hundreds of thousands of dollars, and were run to develop a prospect whose value was an unknown quantity, and evidenced only by one or two prospect holes on the surface.

Tunneling is the most costly method of development known, under ordinary circumstances. The only good reasons which ever exist for running them, as recognized by mining engineers and experienced, intelligent miners, are three:

First—Where the cost of hoisting water is sufficient to make it profitable to run a tunnel for drainage purposes.

Second—Where the mine is located in a practically inaccessible spot, or where danger from snowslides renders developments on the surface of the mine dangerous.

Third—Where the object is to feather one's nest by selling stock, leaving the purchasers to "hold the bag." The last reason may not be generally recognized as a worthy one, but as the great majority of men evidently appear to recognize stock swindles as a legitimate line of industry, it must be classed among the valid reasons for running tunnels.

Excepting a few in the San Juan country which are run for the second reason mentioned, and less than half a dozen in Northern Colorado, not one can be called to mind which ever had any sensible and honest reason for existing. Still this method of development is going on with its usual vigor.

Time may come and time may go,
But folly runs on forever.

As all moneys expended in mining and prospecting are chargeable to the mining industry, it is no wonder that the saying is common that "every dollar produced in mining costs two dollars." The only wonder is that it don't cost a good deal more than two dollars.—*Denver Tribune-Republican.*

Mining in Nevada.

The *Genoa Courier* says: A revolution has taken place in the management of mining affairs as well as other industries in Nevada. In years past when farmers sold their half-cured hay in the field at \$100 per ton, and the price of everything else was in proportion, money was plentiful and speculation and extravagance was a natural consequence. Mines were operated on assessments and the owners made their money out of manipulation of the stock. Superintendents were chosen from a class of men who were good for nothing else, and this was generally the only qualification they possessed. Extravagant salaries were paid, and waste, mismanagement and dishonesty prevailed in every quarter. Eastern people were victimized to such an extent that it has ever since been a difficult task to convince them that there is any such thing as legitimate mining. However, those days of hurrah and excitement have passed, and we may say that mining is now established on a solid business basis. Men are selected to superintend the work who have a reputation for experience and ability. Economy is practiced in all the details, and while the annual product of precious metals may not be as great as in times past, yet we predict that the average profit will be much greater on the capital invested. Experience is a thorough teacher, and when Nevada shall have learned her lesson perfectly and when her people give up gambling and turn their minds to legitimate mining, they will prosper. There is no lack of gold and silver in Nevada, which, by the use of capital, intelligence and economy, can and will be mined at a profit; but fortunes can no longer be made and lost in a day in mining speculations.

BULLYCHOOP DISTRICT.—Bullychoop mining district is now alive with business activity. H. B. Williamson is at work putting up his mill, some of the machinery of which is not yet on the ground. The owners of the Pound Ciske are developing their mine rapidly and taking out rich ore. One of the partners has gone to Frisco to see about purchasing a mill and concentrators. Phalen & Parker, who boned the Caucasian mine, are running a tunnel to tap the ledge about 185 feet deep. The vein is about three feet wide, and the ore extracted from a 35 foot shaft milled \$50 a ton. On the first of May the Bullychoop company expect

to resume developments. Their hoisting works are now at Anderson. The Bullychoop road is to be extended to Indian creek this spring, which will open a good wagon road from Anderson to Weaverlyville. The miners of this camp have petitioned for a postoffice, and have also asked the Postal Department to establish a mail route to connect with the route to Ono. Stevens & Smith have commenced work on their hotel, and J. S. Finch is building a residence.—*Shasta Co. Democrat.*

ACCIDENTS IN MINES.—The Royal Commission appointed to inquire into accidents in metalliferous and other mines have issued their final report. In the course of their report the commissioners say:—The evidence taken by the commissioners had made it clear that one important factor of protection against falls of roofs and sides was to provide the miner with a good light, convenient and handy, which would enable him, whilst engaged in getting coal or other mineral, to see and protect himself against defects in the sides and roof of the working places. Whilst we think that the safety hooks at present available may have contributed to prevent fatalities from over-winding, we believe that the best appliance for the purpose is an automatic steam break attached to the winding gear, and we think it desirable that such brake should be introduced where practicable. We consider that measures should be adopted to deal more systematically, and, if possible, more expeditiously, with casualties resulting from the various sources of accidents dealt with in this report. Collieries or mines should be required to provide an ambulance and stretchers for the purpose of conveying to their homes sufferers from injuries received while in the discharge of their duties. Arrangements should be made for the establishment of centers in mining districts, where additional appliances for succor and relief, and also special appliances for exploring purposes, should be maintained in an efficient condition, so as to be ready for use at the shortest notice. It is most desirable that facilities should be afforded for the instruction of men in the use of special auxiliary appliances for exploring purposes, and in simple measures connected with the provisional treatment of injuries. We attach great importance to the systematic inspection of each mine by the workmen, as provided for in General Rule 30 of the Coal Mines Regulation Act, 1872, and we recommend that this provision should be generally and regularly acted upon.

ANOTHER GOLD SAVER.—Edward Pike, of Salt Lake, is in Central, Col., with a sluice-hox amalgamator which commends itself as being ahead of anything in its line in present use. The invention consists of a series of fixed hoxes set about six feet apart in a main sluice. These fixed hoxes are made about two feet long, and at the upper end they join the bottom of the main sluice again, making a triangular shaped hox. At the bottom of this is placed the quicksilver or amalgamated plate, and above, running parallel with it, and covering the entire fixed hox is a plate perforated nearly to the end. In working, everything is minutely divided and thrown with force through the perforated plate upon the working plate below and is then again worked up into the main sluice. Sureness of contact with quicksilver—no matter how fine the mineral may be—is simply accomplished, while there is no danger of "filling up" from heavy sand or gangue. An application of electricity is also made in this hox which has never been successful before, by which the lower and the upper plates form the negative and positive poles. This is claimed to keep the quicksilver bright and catching, and can readily be attached. Simplicity, cheapness of construction, general adaptability and efficiency—numerous tests having proved its superiority—are what is claimed for this machine. A rough test at one of the mills in Central, showed traces of amalgam in a couple of hours. Mr. Pike will place one or two machines in Colorado, then come to Idaho to test it on Snake river float gold.

CONSERVATIVE MANAGEMENT.—From a London mining paper we learn that quite an exciting meeting of the shareholders of the Ruby-Dunderberg Company was held in that city recently. By some of them it was considered that the allowance made the triphiters in the mines was too liberal. We have not heard of any of said triphiters having become possessed of a competence, even after years' of hard labor by some of them. In fact, we know of none of them who can boast of a bank account. A brief visit to the Base range would, without doubt, convince any of said dissatisfied shareholders that the Ruby-Dunderberg's management here is one of the most economical, reliable and conservative in the district.—*Eureka Sentinel.*

SQUAW CREEK.—All the mines being opened on Squaw creek are looking better every day. The L. M. Co.'s mill has been doing splendid work turning out hullion at a rate exceeding the company's anticipation. Finding that they were wasting too much in the sulphurets the mill was stopped till concentrators and another mill is added, which have already been ordered. The Cistus mill is doing good work and this company's clean-ups far exceeded their expectations also, and as a consequence members of the company wear broad smiles. We hear it reported that Jack Conant has ordered a mill which he will erect on the Uncle Sam.—*Shasta Co. Democrat.*

The Public Lands.

It looks very much as though 1886 would prove a bad year for those who are holding public lands without due right thereto. Congress is making short work with forfeited land grants which will restore a vast area to this public domain, and General Sparks, the commissioner of the land office, is laying up much trouble for individual intruders who have obtained possession of lands without proper title. It rather seems now that it was high time a new broom was introduced into the Government land office and General Sparks has handled it vigorously. He was called upon by the Senate last week to report the number of special agents he had employed and their duties, and the extent of evil he suspects may be gained from his answer to the Senate, which was that if the increased force recommended in his annual report he granted, the entries suspended by his order of April 3, 1885, will be investigated and disposed of in about a year and a half. A large percentage of these entries, he thinks, are fraudulent. The proportion of new cases that will require such investigation will be much less than in those previous to April 3, 1885, since the order of suspension has had the effect of materially checking the making or completion of fraudulent entries. It was the esse with which frauds could be perpetrated under existing laws and the immunity offered by the hasty issue of patents, he says, that encouraged the making of fictitious and fraudulent entries. The certainty of a thorough investigation would restrain such practices.

Commissioner Sparks believes, however, that the evil cannot be fully cured without repealing all the laws under which the plundering system has prevailed: to wit, the pre-emption, homestead, timber culture, timber land and desert land laws, and says the questions, broadly stated, are whether the public lands shall be protected and an honest acquisition of title thereto insisted upon or the dishonest appropriation thereof be allowed. The questions cannot long remain in abeyance. With the present heedless rush of speculation and monopoly, the public domain will be absorbed in a period of time so brief that even preventive measures against fraud and misappropriation may soon be too late to save any considerable portion of the public lands for homes for the people.

It seems that the demand for land from actual settlers cannot be filled much longer until the land illegally held be restored to the public domain. There seems to be now more than ever a demand for such farming lands, for our growing population needs more room. This being the case, it is much more important that all land which is fitted to maintain families on small farms should be restored and used as it is the manifest intention of the people that it shall be used.

At the railroad shops in Sacramento there are now 1200 men at work, the employees having been recently increased to that number. The additions to the force have been made gradually, and have been found necessary by the constant accumulation of work. The outlook for continued employment of the car-shop employees was never brighter. The railroad rolling shop is running night and day, turning out "track trimmings" for the extension of different lines. There are about 50 flat and hox cars to be rebuilt and 125 "flats" to be transformed into coal cars. The street cars for the new Hayes Valley cable line are being manufactured at these works, and there is a large number of small jobs on hand.

IONE COAL is being substituted for wood as fuel at the Jackson gas works. Mixed with coke, it is found to answer admirably. It costs \$5.50 per ton delivered at the works—the same price as a cord of wood. It is claimed that a ton of coal will last twice as long as a cord of wood, and if this is found any way near the truth, wood will be entirely dispensed with. Jackson is only 14 miles from the coal mine, and yet it costs nearly double to get coal here than it does at Fresno—200 miles distant, where the same coal is sold at \$3 per ton. Such is the effect of railroad communication.—*Amador Ledger.*

The question as to whether a corporation has the same rights as an individual, under the law, in locating mining claims is about to be tested. A Colorado court recently decided that a mining claim could not be located in the name of a corporation, and an appeal to the Supreme Court of the United States has been made.

A **POCKET** was recently found by a man named Kipp, near Jayhawk, in this county, which panned out 22 ounces of gold. The queer part of the story is that he was led to its discovery by an old lady who dreamed that the gold was there, and who directed him where to look for it.—*El Dorado Republican.*

The *Mariposa Gazette* says: We understand that the branch railroad from Turlock to Merced Falls will be built, the money required having been raised, and work will soon be commenced.

MOTH INFESTED articles should be saturated in naphtha or benzine. It injures nothing and kills the destroyer.

Notices of Recent Patents.

Among the patents recently obtained through Dswey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DISINFECTANT.—A. P. Bouton, assignor of one half to W. B. Farwell, S. F. No. 341,091. Dated May 4, 1886. This is a composition of several ingredients which is odorless and harmless, and the action of which is instantaneous. It is applied by sprinkling, pouring or exposing in open plates or vessels, or using it in any way in which disinfectants are now used.

COPYING PRESS.—David Samuels and L. Breidenstein, S. F. No. 341,056. Dated May 4, 1886. The invention relates to that class of copying or letter presses in which a roll or rollers are employed to effect the necessary and equal pressure upon the copying hook which passes under or between them. It is so arranged that the pressure is a constant one and is regulated in force according to the thickness of the letter-book. It needs no adjustment, this being entirely automatic.

AUTOMATICALLY FEEDING WINE CASKS IN CELLARS.—Geo. Johnston, S. F. No. 340,786. Dated April 27, 1886. The object of the device is to keep constantly full the casks or vats of wine or other fermented liquors, thereby lessening the risk of acetic fermentation or other deterioration by exposure to the atmosphere. The invention consists of a novel pipe service for the casks or vats and an elevated supply or feed tank, connected with said service, said tank being actuated by a series of weights to rise as its contents are discharged, whereby the level of the liquid remains at the same elevation above the casks or vats and maintains the same pressure thereon.

ANKLE AND SHIN BOOT AND CORD PROTECTOR FOR HORSES.—John A. McKerron, S. F. No. 341,032. Dated May 4, 1886. This is a boot for horses for protecting the ankle and shin and also the cords in the rear part of the leg. It consists of sections pivoted or hinged together, so as to work independently on each other, these sections having elastic straps attached to them, other sections having huckles secured to them to make the fastenings, these sections being padded and united with the first-named section by pads or rolls, which extend horizontally between the two, passing around the rear portion of the leg.

MACHINE FOR MAKING PICTURE MOLDINGS.—Samuel E. Perry, S. F. No. 341,049. Dated May 4, 1886. This machine for making picture moldings is one of that class in which a pattern-roller and an underlying feed-roller are rotated in opposite directions, and the plastic material is passed between them. This invention consists in the novel construction by which the pattern-roller may be readily removed for the substitution of another with a different pattern, in the arrangement of power-transmitting gears between the two rollers, which permit the vertical adjustment of the pattern roller, still preserving their engagements or mesh, and in the general construction of the machine.

AIR-COMPRESSOR.—Geo. E. Dow, S. F. No. 341,099. Dated May 4, 1886. The invention relates to certain improvements in compressors for air or gas, and is particularly applicable to that class in which the medium is compressed in two or more stages by means of receiving and delivery cylinders, in each of which the compression is partially performed. It consists of compressing-cylinders having their axes in the same line, and the pistons connected with piston rod in such a manner as to be actuated simultaneously, so that no stuffing boxes are exposed to the heat arising from final compression. It also consists in an improved means for surface cooling and in certain details of construction.

GRAFTING IMPLEMENTS.—Orville H. Congar, Pasadena, Nos. 340,699 and 340,700. Dated April 27, 1886. These patents relate to a mechanical device for grafting which has been quite widely tested in this State this season and has met with much favor. The device belongs to that class of grafting implements which are designed for properly preparing the stock for that intimate bark union with the scion, which is necessary for the complete success of the operation. It consists of a stock or handle carrying a peculiarly adjustable and self-discharging, approximately U-shaped or angular knife, adapted to penetrate the edge of the stock, and in a swinging hammer-head attached to the stock and carrying a blade or chisel, adapted to make a cut in the side of the stock at right angles to the U-shaped knife and immediately below it, whereby a core is cut out, the removal of which leaves a mortise for the reception of the scion, which is properly prepared by means of a tool which is covered by the second patent mentioned above and which consists in parallel adjustable knives adapted to receive the end of the scion and between them and cut or shave off from each side sufficient material for a tenon. By the joint work of these two devices a scion is set in the stock with mechanical accuracy as a joiner's tenon in a mortise, and perfect contact of the materials of the two is secured at all points. Aside from the facility and speed with which the work is done, there is decided advantage in the exact fit secured and in doing away with splitting the stock—both of which features of the device administer to strong and healthy union.



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A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, May 22, 1886.

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Passing Events.

Silver miners will feel discouraged to see the low quotations of silver this week, the price having reached 98 cents per ounce—the lowest in 125 years. This will have a very bad effect on the silver mining industry.

The Anti-Riparian Convention is in session in this city this week. The recent decision of the Supreme Court of this State, which enforces the old English law of riparian rights, will, it is thought, do great harm to the regions of the State where irrigation is carried on, and where water is taken from streams for mining ditches. The miners, as well as the farmers, are interested in the question.

Honduras and Alaska are just now attracting considerable attention from the reports received concerning gold fields. There are drawbacks to both regions, however.

XANTHATES.—Since the printing of the "first forms" of this week's PRESS, containing Mr. Aaron's article on xanthates, we have received a letter from him asking us to return the manuscript for correction, as some errors had been made in the modus of the reaction in precipitation of copper. However, as the article was already printed, this wish could not be complied with, but Mr. Aaron will make the necessary corrections in a future number of the PRESS.

Tributing.

The Dunderberg mine, at Prospect Mountain, Eureka, Nevada, one of those belonging to the Ruby and Dunderberg Mining Company, of London, has been worked entirely on the tribute system for the past year. The results to the company, however, have been less than for some time past, owing to a smaller number of men working there and the quality of the ore being generally of lower grade. Only 419 tons were extracted, from which the company realized but \$1889.

At the recent meeting in London some of the shareholders were opposed to the tribute system, as they thought it was only adopted when owners think poorly of a mine, or when the funds are not forthcoming for the company to work it themselves. The secretary replied to certain questions on the subject by saying that the company did not make arrangements with one man for the whole of the tribute, but get them to go to work for themselves. They work in gangs of two and three. At present, the mining camp being in low water, many of the best miners have left it altogether, and it has been difficult to get a sufficient number of tributers. Each arrangement is a separate one with the mining captain. As a rule, we get one-fourth or one-fifth of the proceeds; they pay all expenses to the mill. The tributers will not do dead work; they only follow ore. They got from the Lord Byron mine, belonging to the company, three times as much as the company itself, but they have to pay wages and smelting, the owners getting then one-fourth without expenses.

One of the shareholders declared that it was always dangerous to put mines on tribute, and he particularly objected to the system at Eureka, where the wages are not too high. Another thought that the directors had done right in working by tribute. He doubted, considering the rate of wages, whether the company could get as much by working the mine by day's work as in working it by tribute.

One of the directors said the shareholders seemed to forget that they could get rid of the tributers at a month's notice, but the board were guided by the mining captain. The manager said he wished to employ them because they were producing better results by working on tribute than by working in the ordinary course. If he came upon a body of ore he would at once stop the tribute, but in the meantime the tribute was so much profit. However, this matter would be discussed again fully at the board. The shareholders must leave the directors a little discretion, but in the meantime it was undeniable that the tribute had produced a certain amount of money which had assisted the company.

New Fuse and Igniter.

A patent has recently been taken for a new instantaneous fuse and igniter, the object of which is the firing of several holes simultaneously. This firing has hitherto been accomplished by means of electricity, but this is entirely dispensed with when using the new fuse.

The igniter is a tin cylinder from which protrude, like the arms of an octopus, small lengths of a special kind of fuse which burn instantaneously. A piece of this fuse is inserted into each hole intended to be fired, a piece of ordinary fuse serving to convey fire to the igniter.

After lighting the ordinary fuse, the miners have plenty of time in which to retire. When the fire reaches the igniter, it flashes down in an instant to each of the separate charges, and they explode simultaneously, doing more work than if they had been exploded singly.

TRAVELING CORRESPONDENT. — Frank W. Smith leaves this week for a trip to Washington Territory, British Columbia and other northern districts, in the interests of the MINING AND SCIENTIFIC PRESS. Mr. Smith has previously represented the PRESS in the mining regions, having once traveled through New Mexico and Arizona. His letters from the various mining camps were full of value for our readers. He has had considerable experience in mining districts, and we trust that those he meets in his travels will favor him with such information as they possess concerning the regions where they reside.

New Drilling Machine.

John C. Muirhead of Grub Gulch, Fresno county, has obtained a patent through the MINING AND SCIENTIFIC PRESS agency for a form of rock drill, which is a sort of combination of hand and machine drill. The blows are struck by the miner with a hammer on the rear end of the drill, and the rotation is made by a foot-treadle. A standard is used just as in a machine drill, so that the implement may be fixed in any position in a shaft or tunnel. On the standard is clamped a plate or frame from which the drill is supported. The ratchet and its journals are fixed to the plate and are made hollow, being shaped to fit the exterior of the drill which is of polygonal steel. The ratchet and journals are made in two halves, so they can be thrown back to allow the drill to be put in its place. The drill can be put in the device without trouble, and the expansion of the drill point or the battering up of the head by the blows upon it will not interfere with the drill being introduced or taken out.

In order to rotate the drill and ratchet, a movable pawl is fitted to slide on a guide and a spring is fitted fixedly within this guide box and tends to force the pawl upward, so that the projecting end or hook will engage a tooth of the ratchet wherever it has been raised above the tooth. This pawl is connected by a cord or rod attached to a foot pedal, so the drill may be rotated while being operated. The drill may be fixed at any desired angle.

When the miner desires to work with this drill, he strikes upon the end of it, the point resting against the rock in line with the direction in which it is desired to make a drill hole. As he strikes, he presses his foot upon the treadle and thus rotates the drill slightly an instant before the blow falls upon the head of it. In this manner a man can easily do rapid drilling work. The mechanism is quite simple but appears to be effective.

Bar Silver.

The latest quotation for bar silver, in New York, is 98 cents per ounce, the lowest price ever reached. A week or so ago, when it fell below \$1.01, the silver miners felt discouraged, but now there is a much greater fall. There are many mines that can no longer be worked to a profit with such a very heavy discount on the product. When silver is supposed to be worth \$1.29 an ounce, and only sells for 98 cents, with no certainty of its remaining even at that figure, silver miners may well feel discouraged. With lead and copper at low figures also, men who are mining either of these three metals must have very good ore and plenty of it to make any money. There was a sharp decline in silver some ten years ago, but it was only temporary, but that prevailing now has been so gradual and steady that there is no hope of a sudden upward jump.

There is a strong probability that this marked decline will close down a number of mines that have been just keeping even at former prices. It is only a year since that silver was \$1.10, and now we have it at 98 cents. On the 17th inst., the price in London was 44½ per ounce 925 fine, or 98 cents in New York per ounce 1000 fine. This makes the value of a 41½-grain dollar 75.9 cents. It costs the Government about 1½ cents to make one of these coins. A standard dollar made from bullion bought at the 98 cents valuation costs the Government 77.4 cents. These coins are used to discharge obligations of 100 cents against the Government. Under free coinage this profit would go to the owners of the bullion.

There have not been many fluctuations in price this year, the quotations showing very little change until about the first of April, since which time the decline has been steady. The prices are really fixed in London. The changes cabled from London to the Bulletin since March 4th of this year show the ruling prices on the dates mentioned, and have been as follows:

	Pence.		Pence.
March 4.....	46 12-16	April 13.....	46 7-16
March 8.....	46 11-16	April 14.....	46 5-16
March 9.....	46 12-16	April 15.....	46 3-16
March 12.....	46 11-16	April 19.....	46 4-16
March 13.....	46 12-16	April 23.....	46 2-16
March 15.....	46 14-16	April 29.....	46 1-16
March 17.....	46 13-16	April 30.....	46
March 20.....	46 12-16	May 3.....	45 15-16
March 23.....	46 11-16	May 4.....	45 14-16
March 26.....	46 12-16	May 10.....	45 13-16
April 1.....	46 11-16	May 13.....	45 10-16
April 2.....	46 10-16	May 14.....	45 6-16
April 9.....	46 9-16	May 14.....	45
April 10.....	46 8-16	May 17.....	44 12-16

Coal Consumption on Steamships.

The owners of some of the "greyhounds of the sea," running as passenger steamers on the Atlantic, are seriously in doubt as to whether the very large end fast steamers have done them any good. To make the high speed which they must to maintain reputation and attract tourist travel, entails great expense for fuel, and it is only for a few months at a time that these steamers make any profit. In fact they must have a full complement of passengers at any time to pay. They save a day or two days' time in crossing the ocean, but at the sacrifice of much money. The first cost of these fast steamers is very great. Their engines must be of superior make and the extensive machinery and boilers and necessary coal bunkers take up a great deal of cargo space. On a single trip the *City of Rome* is said to consume no less than 2300 tons of coal.

Since the loss of the *Oregon* many timid travelers are of the opinion that it is better to go with less speed and more safety. Judging from present appearances, the expensive and fast steamships are not likely to increase in number as rapidly as heretofore. Some of the companies which have built them have had to give them up for slower and less expensive vessels. Every effort is, however, now directed toward reducing coal consumption, and triple-expansion engines are displacing the compound. It will be remembered that part of the price paid by the Cunard Company for the *Umbria* and the *Etruria* was made up of the two steamers *Parthia* and *Batavia*, which are now the property of Mr. Pierce, M. P., president of the Fairfield Company. The old compound engines were removed by him to make room for triple-expansion engines and steel boilers. The log of the *Parthia* in 1883 shows that she burnt 47 tons of coal per day of 24 hours when going at a speed of 11 knots. Her log during 1885-86 shows that the consumption was 25 tons at the same speed. Her speed is now much higher, but the comparison must necessarily be made with her old rate. The *Batavia* gives still better results. The consumption in 1883 was 40 tons per day at 11 knots. In 1885, with the new engines, it was only 21 tons.

Domestic Industries.

The prevalence of low freight rates for some months back, between here and the Eastern States, has not been to the advantage of our home industries, many of which have suffered from sharp competition. At the last meeting of the Manufacturers' Association the depression of the manufacturing interests was considered and various suggestions were offered how best to improve them. It was decided to procure detailed information of the actual cost of production and expense of leading articles at the East for comparison with like articles here, with a view of showing the benefit of patronizing domestic industries, and so giving employment to more of our own people.

The question of freights to and from the Pacific coast, and particularly in relation to the distribution of goods from this city to local and other points, was discussed at length. It had been found that a great diversity of rates exists in different directions, and to many places the cost of transportation entirely prohibited the supply being shipped from San Francisco. It was accordingly resolved to appoint a committee of the board to act in conjunction with like committees from the Board of Trade and Chamber of Commerce, with a view of procuring an adjustment upon some equal and uniform basis of the rates of freight on goods coming to or going from the coast, and particularly upon goods going from San Francisco to interior points.

After considerable discussion, and in view of the good the association has already accomplished and the greater benefit to be secured, by united and intelligent action toward the preservation and advancement of these interests in this State, it was proposed that a committee should be appointed to devise and present a plan for obtaining the active cooperation of all engaged in domestic enterprises, so that the common interests may be upheld and the association be, in fact, what its name indicates—an exponent and promoter of every industrial pursuit, which gives employment to our citizens.

It is believed in Washington that the President will veto the River and Harbor bill,

The Frisbee-Lucop Quartz Mill.

(Continued from page 337.)

bolts. Between the roller and disk plate a thin piece of iron is shown, which takes the wear of end of roller, and is replaced when worn out.

These mills are built in three sizes, 24-inch, 20-inch and 10-inch, these sizes being the inner diameter of the ring. The weight of this 24-inch mill is about 5500 pounds. The inner diameter of the ring is 24 inches, and width of face of ring six inches; the rollers eight inches diameter by six inches face, weighing 80 pounds each. The main shaft is of steel, three inches in diameter, with bearings 10 inches long and three inches diameter. The speed in running should be 300 revolutions per minute, at which rate the mill will grind 2000 pounds per hour of quartz to 60 mesh powder, and up to 4000 pounds of softer material, requiring from 12 to 18 horse-power, according to hardness of material ground and speed of the mill. The material to be ground is first passed through a crusher to a size of one inch or less, as may be convenient, and then fed by a chute directly on the feed shoe. The screen mill can be used for either dry or wet grinding; and the only change necessary for wet grinding is to introduce the necessary amount of water into the feed opening in the top of the mill. This is a valuable feature, as it removes the necessity for drying rock before grinding, when the pulp is to be worked wet, by concentration or amalgamation, as it can be run directly to concentrators, pans, or plates.

The 20-inch mill weighs about 3800 lbs.; the interior diameter of the ring is 20 inches; width of the face of the roller, 3 inches, and has a capacity of 1000 lbs. of hard quartz per hour to 60 mesh powder dry; speed, 500 revolutions per minute, requiring about 8-horse power.

The 10-inch mill is intended for assay offices and for use where only a small production is required, and has a capacity of 150 to 200 lbs. per hour.

Mr. E. N. Riote, well known on this coast as a skillful metallurgist, and now manager of the New York Metallurgical Works, has been using two sizes of these mills on quartz for five years, and states that they pulverize more quartz for a given amount of wear and tear than any machine he has tried. The 12-inch mill gives 200 to 300 pounds per hour dry, when closed with a No. 40 screen. Ninety per cent of the pulp passes a No. 80. Mr. Riote says: "The pulp is almost identical with that furnished by dry stamp battery, as comparisons show. Wet, 400 pounds per hour can be relied upon, with the same screen, averaging finer than battery pulp under similar circumstances. The main advantage, however, is that the pulp can be discharged as a thick mortar just the right temper for pans. Those who know by experience the great amount of water needed by stamps if they are to do much work, of the trouble in settling tanks, of the floating chloride, etc., etc., will see in this fact the machine's strongest point for free gold and silver ores. The 20-inch machine gives on average gold and silver quartz 800 to 1200 pounds per hour dry (all acid of the pulp from the 12-inch machine applies to the pulp from the 20-inch). One ton an hour up to 2500 pounds is easily achieved, running wet. The change from dry to wet can be made instantly by simply turning on water. Of the 24-inch mill we can only judge by the action of the smaller ones, and confidently believe that one ton an hour, dry, or two tons, wet, of hard quartz would be a low estimate.

"Its first cost and cost of erection, as compared with stamps, is very small, \$800 paying for a machine ready for the belt, equal to a 10-stamp dry mill. In using stamps, dry two-horse power is required to pulverize a ton of good, honest quartz in 24 hours. The 20-inch mill will give from 10 to 15 tons in 24 hours and require eight-horse power. We find the wear of parts and renewals to be less than with stamps, say from one-half to one pound per ton dry, according to the hardness of the quartz, and from one-quarter to one-half pound per ton in wet crushing. In comparing the latter figures it should be borne in mind that wet crushing through a No. 40 wire mesh is meant, not crushing through a No. 2 or No. 3 sloop-punched screen.

Renewal parts are furnished by the company, whose advertisement appears in another column. A 24-inch mill costs complete \$1,200; 20-inch, \$800; 10-inch, \$400. Several of these mills will shortly be put to work on mines in this State, where miners can examine them, and we shall mention the localities in due time. Mr. Gideon Frisbee, the manager of the company, is now in this city arranging for the introduction of the machine on this coast.

A Curious Gold Mine.

There is a gold mine in the Port Curtis district, Queensland, which has some very peculiar characteristics. The gold deposit is supposed to have been formed by a hot spring, and the possibility that the discovery may lead to others of equal importance in a direction where gold has never hitherto been looked for, lends it a wide significance. Given a hot spring rising from depths in which auriferous ledges lie hidden, we may look for a repetition of this phenomena of Mount Morgan. Robert L. Jack, the Government Geologist, in a paper ordered printed by the Legislative Assembly, describes this Mount Morgan gold deposit, and after a careful study of the whole formation comes to the conclusion that nothing but a thermal

Ivor and Mulgrave volcanoes, probably dates from tertiary times, and is contemporaneous with many of the basalts which cover auriferous drifts in Victoria.

In the presence of so much ironstone a precipitant for the gold need not be far to seek. Protoxide of iron was probably present in sufficient quantities to perform this important function, but it may have been aided by tannic acid derived from vegetable matter accumulated in the basin. Several instances of the occurrence of vegetable matter in the basin of hot springs in the Yellowstone region are recorded. Precipitation of the gold by means of tannic acid would accord better with the confinement of the gold to the basin or crater of Mount Morgan (to be afterward alluded to) than precipitation by ferrous oxide.

The outer boundary of the overflow deposit is, in some places, ill-defined, as the "country rock" is frequently impregnated with aluminous, siliceous and ferruginous material, so as to be distinguishable with difficulty from the unmixed deposit. That this deposit does not extend far to the east of Mount Morgan is owing simply to denudation, the deposit having been removed from the steep slope of the hill on that side.

In such active geysers as are accessible to

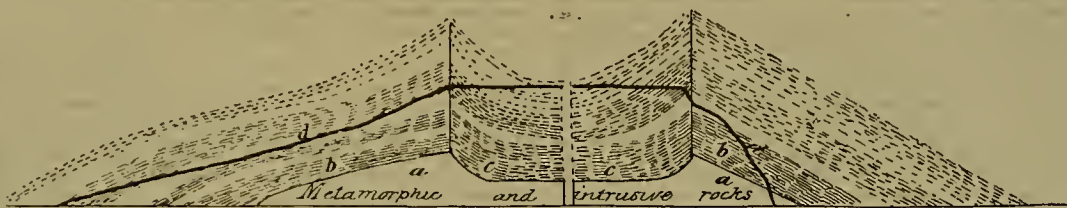


FIG. 1.—DIAGRAM SHOWING BUILDING-UP OF GEYSER DEPOSITS AND SUBSEQUENT DENUDATION

spring, in the open air, would have deposited the material in which the gold lies. It will be of interest to trace his theory of the subject.

Fig. 2 is a diagram across the valley of the Dee, showing the location of the deposit on Mount Morgan. In class a shows the metamorphic rocks; b, rhyolite, etc., dykes; c, desert sandstone; d, thermal spring deposits of Mount Morgan.

The diagram-section will elucidate the remarks that follow: Standing on the sandstone cliffs, so as to look to the east past the south side of Mount Morgan, the observer can descry across the valley of the Dee the familiar contour of horizontally-bedded sandstone cliffs, stretching north and south. As nearly as can be judged by the eye, they are on the same level as the cliffs on the opposite side of the valley, and there can be no doubt that the valley has been carved out of a

observation, we find a narrow pipe or fissure, terminating upward in a crater-like cup or basin. The Great Island geyser, for example, has a pipe 12 feet in diameter, which has been sounded to a depth of 70 feet. I have seen no satisfactory explanation of the necessity for a cup, nor can I suggest one, but all the same the repeated occurrence of the cup evidently takes place in obedience to some natural law. It may be taken for granted that the Mount Morgan geyser was no exception to the rule, and I believe that the upper portion of the mount, where ironstone predominates, and to which gold is almost confined, represents a basin occasionally filled with a fluid, in which silica, iron, alumina, manganese and gold were held in solution, to be deposited when the bulk of the water from time to time withdrew into the pipe or the subterranean reservoirs with which the pipe communicated.

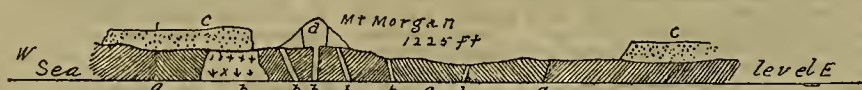


FIG. 2.—SECTION ACROSS THE VALLEY SHOWING MT. MORGAN.

once continuous cake of horizontal sandstone. The question arises, Was Mount Morgan an island in the sea or lake in which the sandstones are laid down? In that case the hot spring was older than the desert sandstones. The answer is easily made. Had there been shores to this sea or lake where Mount Morgan now stands, the sandstone in the neighborhood would have been full of pebbles of sinter and ironstone derived from the waste of such easily degraded rocks. None of these occur. The hot spring, then, was newer, and not older, than the desert sandstone.

In many places in the North the valleys carved out of the desert sandstone became theaters of volcanic activity. These volcanoes burst out near the heads of the valleys, and filled the lower reaches with flows of basaltic lava, to which we owe some of the richest agricultural land in the colony. Another form of volcanic activity was developed at the same period near the head of the Dee Valley. After the desert sandstone had been uplifted, and the carving out of the present valleys had been carried on for long ages—in fact, till the valleys had nearly acquired their present contours—basaltic lavas flowed down the valleys over the upturned slates of the MacIvor, and over the auriferous drifts of the Mulgrave, and a geyser of enormous proportions spouted fitfully in the valley of the Dee, carrying with it not only water but in all probability chloride of gold.

The Mt. Morgan geyser, as well as the Mac

Working Gold-Bearing Sulphurets.

Concentration and Chlorination in Nevada County, Cal.—No. 2.

(Written for Press by C. A. SCHNECK.)

It is a most interesting and instructive experiment in working a Frue concentrator to turn off the water of the water-spreader for a few minutes. The separation of ore and sand under the latter ceases at once, and a mixed layer of the two materials is carried over the head of the machine; if now the water is turned on again, final concentration commences immediately. The shaking table revolving around the rollers brings continuously forward new portions of settled ore, to be acted upon by the jets of water, and bright yellow bands of clear sulphurets are produced, while the unproductive sand is rolled back.

Quantity of Water in Concentrating.

It must become evident at once from this description that only one quantity of water per minute from the water-spreader will answer the purpose for a certain class of ore, the density of the pulp from the ore-spreader being supposed to remain the same and the traveling speed, number of revolutions of main shaft being also given. Too much water might wash off particles of metallic mineral, and too little would produce unclear concentrates.

But it is not difficult to regulate the quantity of water needed. Changes in the traveling speed and inclination of the table, which latter is at the Providence 3 inches to the 12 feet, are also means to regulate the work of the Frue in producing concentrates of desired purity. The latter expedient

is hardly ever made use of, if the same class of ore is worked. Diminish the uphill travel if too much sand comes over the head, and increase it if the bands of sulphurets are getting elongated under the water-box toward the ore-spreader.

The so-called field between the two latter should always be well covered with diluted pulp in which the final concentration has not yet begun, or, in other words, where the bands of clear sulphurets are not yet to be seen.

Slimes.

The pulp from the Providence battery, passing through a number six punched screen, produces but very little fine slime, and the loss on this account is consequently small; but there is another reason which makes it evident that this loss in sulphurets must be almost nothing. A small percentage of sand in the concentrates is beneficial in roasting them, and the presence of this small percentage, which could be kept out if desired, is a guarantee that all the concentrates are saved, with the exception, perhaps, of the very finest slimes.

In working ore which produces a great deal of fine slime in crushing, concentration becomes more difficult; but even in such a case the Frue will still prove effective, the *modus operandi* being changed to satisfy this class of ore. The effect of the water may first be considered in this connection. If the volume of pulp from the battery plus volume of water from water-spreader is too large, forming a rather thick sheet of diluted pulp on the table, much of the fine slime will wash away and float off, having, under these conditions, not sufficient body, chance and time to settle and cling to the belt, from which it is too far distant—being on top of the supposed thick sheet of pulp. This detrimental effect will be increased if the table is inclined too much. The work to be done in this case, in regard to quality, is therefore a function of the amount of water coming from water-spreader, quantity of pulp from ore-spreader and grade of table; so that, if such ore is worked, most of the fine slime will be saved if the sheet of pulp on the table is thin and the grade small. But the quantity put through in a certain time will be less.

The sub-Treasury at Chicago has commenced packing up \$5,000,000 in silver coin for shipment to Washington, in order to relieve the pressure upon the vaults in the Government building.

Gold to the amount of nearly \$3,000,000 was exported week before last, and foreign houses expect the movement to continue.

MECHANICAL PROGRESS.

Aluminium Iron and Steel.

One of the great difficulties in making castings from steel is to get a product which is solid, sound, homogeneous, or free from blisters or cavities. The addition of ferro-manganese and other compounds containing carbon, silicon and manganese makes the product somewhat more solid, but deteriorates the quality in other respects, as the product gets harder and more brittle or red short. It has been impossible to make castings of wrought iron or mild steel at the same time solid and retaining their qualities and their strength. Mr. Nordenfelt, the inventor of the well-known machine gun, has recently discovered that solid and perfect castings of wrought iron or mild steel may be obtained without changing the intrinsic quality of the metal by the addition of the metal aluminium, either alone or in the shape of an alloy. The aluminium makes the molten metal more liquid, thus the gases in the metal pass easily away, the metal runs easily into the molds, and a more perfect product is obtained. Even a minute quantity of metallic aluminium added to the molten iron has an appreciable influence.

Perfect castings of considerable ductility and great tensile strength have been made from the softest wrought iron. The iron or steel is melted in crucibles, converters, or metal smelting furnaces of any description, and the addition of the aluminium or alloy of aluminium is made to the metal when molten, shortly before it is to be poured. The addition may, however, be made earlier. It is convenient to provide a plug in the cover of the crucible, which is removed when the metal is completely melted; a tube is inserted into the aperture, and the aluminium to be added is passed down the tube. The tube is removed and the plug replaced, and the metal is soon ready for pouring.

Another important advantage gained by this addition to the iron or steel is the reduction of the temperature at which the wrought iron fuses—about 4000° Fahr.—as it is in this very great heat which is required for melting wrought iron that the absorption of the gases is brought about, which so materially affect the quality of the castings.

The patent which covers this improvement is known as

The Mitis Patent.

And the product as mitis castings. In making these castings only an exceedingly small quantity of aluminium is employed—about 5-100 of one per cent. This small percentage is added in the form of an iron alloy, consisting of about eight per cent of pure aluminium. On the addition of this alloy, the fusing point is at once reduced, as above, and the alloy becomes extremely fluid, so much so that it can be cast in the finest molds, while the great difference between its temperature and its fusing point gives all the time necessary for manipulating it without danger of its solidifying. The extreme fluidity of the charge allows the ready escape of the gases, which otherwise would make a porous casting, while now the result is a remarkably fine, solid and tough casting of wrought-iron.

These mitis castings are said to be 30 to 50 per cent stronger than the iron from which they are made, but though aluminium undoubtedly greatly increases the strength of most of the metals with which it alloys, it is not credited with the increase of strength in this case, for it is said that if the mitis metal is subjected to the process of hammering it, loses its increase in strength and returns to the fibrous appearance and to the strength of the original iron.

Referring to this process the *Engineering and Mining Journal* says that this utilization of this well known property of an aluminium alloy to lower the fusing of temperature of the iron is a very neat and clever application of a curious phenomenon. In rendering the metal more fluid it also obviates the necessity of using those extremely high heats that now cause the steel to melt and run into the molding sand.

A Company Formed to Utilize the Discovery.

The telegraph of the 10th inst. announces the fact that a company has just been formed in New York, consisting of prominent capitalists engaged in iron manufacture and cognate industries to utilize this method of casting wrought iron. The dispatch says that the process is also adapted to the making of steel ingots. It is a foreign patent, controlled by Nordenfelt, the Swedish gun founder and torpedo manufacturer.

THE STRENGTH OF GRANITE.—While tests have been made to ascertain the resistance of granite to pressure, too much dependence must not be placed on the results given in text-books. Granite has a cleavage the same as sandstone, although this opinion would be condemned by the orthodox geologist, as it touches on the theory of granite being an igneous and not an aqueous rock. I mention this but to reiterate what I have before asserted as to sandstone—namely, that to use granite so as to get the greatest resistance to pressure, the stone should be used so that the force should be at right angles to the cleavage or bed of the materials. Granite, like sandstone, laid upon its natural bed, will increase in strength in the ratio of its superficies. However, if granite is fairly bedded on an equal and resisting founda-

tion, no load can in ordinary circumstances crush it. It may be safe enough, in dealing with granite, to take from 684 to 848 tons per square foot as a fair test of its strength.—*James Govans.*

Evidences of Mechanical Progress.

There are many evidences of recent progress in mechanical matters, and one needs to be a close observer to keep well informed of changes that are being made. Every line of manufacturing has its improvements, which must be observed from within, but there are not a few matters of mechanical progress that are plainly open to the public. He who travels by rail may notice that locomotives are being built heavier, and are drawing longer and more heavily loaded cars; also that speeds of trains are increasing. The absence of clouds of smoke and cinders blowing in the faces of passengers can be traced usually to the extension of smoke-boxes and better draft appliances, which are being adopted by most progressive railroads. As the traveler is whirled through the country after dark in an easy comfortable seat on a car finished in artistic style, he observes that cities and villages whose streets were formerly outlined only by rows of dim gas lights have become brilliantly illuminated by clusters of electric lights on tall poles. The web perfecting printing press that a few years ago was believed to be the acme of mechanical skill in that direction has been much improved and, it is believed, will be brought to still greater efficiency. Higher pressures of steam are being carried both on locomotives and on marine boilers. Inside the shop, where master minds are planning these elements of progress, more powerful and efficient tools are being used in turning, boring and cutting metal than were to be had even a few months ago. Machinery is being devised to do what has almost always been done by hand in the foundry and the boiler shop. Mechanics who carefully study what has been achieved by others are the ones who participate in bringing about these progressive changes that are of so much value to the public at large.—*American Machinist.*

A DIFFICULT WELDING.—Foreman Bell of the Boston navy yard forge shop has just completed successfully the largest and most difficult piece of welding ever done in this country. During the last gale the Belgian steamship *Pieter De Coninck* suffered severely, having the massive sternpost to which the rudder is attached sprung and broken. This post of iron is 10x9 inches in thickness, and required to repair it larger forges and hammers than are to be found in this vicinity, it was thought it would have to be sent to Nashua, N. H., to be welded together. However, Mr. Bell constructed large temporary forges, and made his hammers available by an ingenious arrangement of pulleys, etc. The arrangements were completed last Saturday, and on Monday the work was done. Mr. James Wallace, of New York, directed the work. The iron was heated in ten minutes, and for ten or fifteen minutes after the hammer was at work and the work was finished. The picture, seen dimly through the smoky atmosphere, the showers of sparks lighting the dark faces of the workmen, while the whole building shook with the heavy blows struck, was very impressive. About 200 spectators were present, mechanic friends of the workmen and others, and were much gratified with the success of the achievement. Messrs. Bell and Wallace were showered with congratulations for their work.

TALLOW AS A CYLINDER LUBRICANT.—The *Mechanical Engineer* recites the following facts, which should be known to every engineer and mechanic: Some engineers still use tallow as a cylinder lubricant, but they do so at the risk of destroying the surfaces of valve-seats, piston-rings and even the cylinder itself. This is, by reason of the nature of tallow, which is a compound of several fatty acids, oleic, stearic, margaric, etc. It is erroneously supposed that pure grease is the base of all tallow, and that the acids, so-called, are, in some way, incorporated in the process of rendering. No system of refining can eliminate the acid without destroying or neutralizing the grease itself, in a measureaponifying, or turning it into soap. Clear oil is often used by engineers, and an old tin pot set upon the steam-chest is a familiar sight in many engine-rooms, but the evil is not remedied, and the danger to surfaces remains. The steam heat decomposes the tallow or suet, and sets free, or renders active, the fatty acids with the result set forth. The only value in tallow as a lubricant lies in its heavy body, which permits it to remain in contact with surfaces under pressure, but the same object can be attained with mineral oils that are free from adulteration with animal fats.

TRANSPARENT CEMENT.—A French authority gives the following recipe for transparent cement. The advantage claimed is the absence of the slightest yellow tinge, so that the addition of the cement is imperceptible, while it possesses an extreme degree of tenacity: Mix in a well-stoppered bottle ten drams of chloroform with twelve and one-half drams of non-vulcanized caoutchouc in small pieces. The solution is easily effected, and when finished add two and one-half drams of mastic, and let the whole macerate from eight to ten days, shaking the mixture from time to time, but without heat. A perfectly white and very adhesive cement is thus produced.

SCIENTIFIC PROGRESS.

Tornado Predictions.

The Signal Service Bureau is gradually enlarging its sphere of usefulness. It already embraces the condition of the crops in some of its reports, notably on this coast, and it is now proposed that it should inaugurate a special system of tornado signals by which the country, where these destructive electrical disturbances are most frequent, may be warned of their approach by telegraph. Tornadoes are not largely influenced by the laws which govern ordinary storms. The condition of the barometer cannot be relied upon as a means of predicting their appearance, and the ordinary weather signals are quite too slow in giving any useful warning. The disturbing and destroying element in the case of tornadoes is electricity—they are electrical storms—and nothing but electricity is active enough to give the necessary warning. The following item, which we clip from an exchange, will be read with interest in view of the recent tornado which visited Kansas City, and the effects of which men felt for many hundred miles to the east of that point:

Mr. Wm. A. Eddy, of the United States Signal Service, who has given much attention to the phenomena of tornadoes, confirms the opinion of Lient. Finley that our knowledge of these destructive disturbances has been so far advanced by the careful study of the data industriously collected during the past few years, that already predictions of their occurrence may be made with a considerable degree of accuracy.

On the authority of the *Kansas City Review*, we may state in this connection that of 38 predictions that tornadoes would occur in April and June of last year, 18 were verified; of 19 predictions in June and July, 15 were generally verified; and where the characteristic tornadoes failed to arrive, violent wind and hail storms partially fulfilled the prophecy.

Mr. Eddy proposes that a system of tornado signals shall be established at every telegraph station in the States subject to the visitation of these destructive agencies. The necessary addition to the outlay of the service for this purpose would not be large, and the probability is strong that the saving of life and property that would follow the establishment of this system proposed by Mr. Eddy would fully justify it. Even as an experiment, the Government should not hesitate in a matter of such possible importance to a large portion of the country to give it a trial.

THE NEW NEBULA IN THE PLEIADES.—The nebula discovered by the Henry brothers of the Paris observatory, upon their photographic negative of the Pleiades taken Nov. 16, 1885, has been seen—now that its existence is known—without great difficulty, by Perrotin and his assistants at Nice, and by Struve with his new 30-inch Clark objective, and also with the 15-inch at Pulkowa. Struve gives a careful description of the nebula, accompanied by a sketch, in the *Astronomische Nachrichten* (No. 2719), and from his observations it seems probable that some of the small stars in the immediate neighborhood may prove to be interesting variables. The nebula is of a characteristic spiral form, and seems to "escape" from the star Maia. Professor Pickering, upon the announcement of the discovery, recalled the circumstance that certain irregularities had been noticed in a photograph of the Pleiades taken on Nov. 3, 1885, at Harvard college observatory. These irregularities, which had been referred to defects in the photographic process, correspond closely with the descriptions of the nebula, and no doubt represent light photographically visible near Maia. "The explanation thus afforded, of one of the markings on the Cambridge photograph, makes the others of more interest than seemed at first to belong to them. There are indications of nebulous light about Merope; four short parallel streaks directed to the south following side are particularly noticeable, and a faint prolongation of diffuse light may be suspected towards the south in agreement with the description usually given of the visible nebula in that region. There is also a faint streak of light projecting from Electra on the following side * * * No nebulous light is noticeable about Alcyone, Atlas, Pleione, or Taygeta."—*Science.*

LAWS OF MOTION.—The following are the results given in *Nature* of a very elaborate mathematical inquiry, which Professor N. Joukowski has recently made into the laws of motion of a solid body, having hollows filled up with a homogeneous liquid. Various shapes of hollows filled with liquid have been considered, as also the case of a vortex motion of the liquid having interior friction. Some phenomena of the interior motion of the liquid itself, in the case of the solid body when caused to rotate, were verified by experiments which proved conformable to the theory; they have shown that in a body whose rotation velocity is decreasing from its surface to the center (e. g., a glass sphere filled with water, and which is brought into motion), the molecules flow from the poles to the equator, and vice versa where, the rotation being suddenly stopped, the speed of rotation is on the decrease from the center to the circumference. The general conclusion of the inquiry is that if we have a hollow body filled with a liquid, and this system be brought into

motion, its motion will tend to reach a limit characterized by one of the chief axes of inertia of the body taking the direction of the chief momentum of the communicated motion, and the whole system will rotate around this axis as a single body, the speed of rotation being constant and equal to the quotient obtained from the division of the forces applied by the momentum of inertia of the system with regard to this axis. M. Joukowski asks: "Does it not explain the circumstance that our planets, notwithstanding the variety of their occasional primary velocities, all rotate around their axis of inertia?"

A PHENOMENON EXPLAINED.—Remark upon what appears to be the unusual size of the sun and moon, in rising or setting, Strobant points out the common error that intervening objects enable an observer to better estimate the real size of the heavenly bodies, in that the same effect is visible at sea, and indicates the fallacy of several other theories. There are, he asserts, two real causes of the phenomenon in question, both purely physiological—one, the greater sensitiveness of the eye to angular magnitudes near the horizon; the other, a direct effect of the feeble light in the enlargement of the pupil, which, it would seem, tends to magnify objects, even when artificially produced. Thus it is shown by experiments that the distance between two luminous points within a room suffers the same apparent change as in the constellations when, without altering the distance from the eye, the altitude is gradually increased.

TIDES ON THE ATLANTIC COAST.—The great tidal wave which makes nearly two complete circuits of the globe in every 24 hours, is very slight in mid-ocean, but increases in height in traversing shallow soundings, and is still further augmented by converging coast lines. The eastern coast of North America has, as laid down by Bache, a great "southern bay" between Florida and Cape Hatteras, a "middle bay" between Hatteras and Nantucket, and an "eastern bay" north of Nantucket, and while at Southern Florida the tide is 1 to 1½ feet, at Cape Hatteras 2 feet, at southeast Nantucket only 1 foot, the height within the "southern bay" at Savannah is 7 feet, in the "middle," at the entrance of New York bay, 5 feet, and in the "eastern," at Boston, 10 feet, and in the narrow bay of Fundy from 40 to 70 feet.

WATER PURIFIED BY AERATION.—A good deal of attention has recently been given to experiments for the purification of water by aeration, which is the act of combining with carbonic acid, formerly called fixed air. The method is well known to be based on the discovery that the action of air in purifying water is greatly increased by mixing the air and water under pressure. A Fairmount, Philadelphia, turbine engine was converted into an air-pump, which delivered 20 per cent by volume of free air into the water main, this being the proportion found necessary to surcharge the water. Analysis showed that the quantity of free oxygen in the aerated water was 17 per cent greater than before aeration, while the quantity of carbonic acid was 53 per cent greater, and that of the total dissolved gases was 16 per cent greater.

WOODY TISSUES.—The arrangements of fibers and woody tissues in palms and grasses are peculiar and interesting. As an example of the former, the rattan may be mentioned, which runs along on other vegetation for thousands of feet. Here we see the wood, not in a compact form, but scattered with the fibers. In the case of bamboo the fibers form an exterior layer inside of which is a layer of fiber mixed with a good deal of wood. The lightest and most flexible fishing rods are made of these stems with the inner woody layer removed.

WAVE INFLUENCE.—It has been a matter of scientific speculation for years as to how far beneath the surface the roll of the ocean could be felt. A diver who has been down to the Oregon, nearly 200 feet below the surface, says that in one of the alleyways between the houses on the deck he seized a trunk, and, while trying to make fast to it and send it up the surface, the roll of the sea continually swept him and the trunk athwartships. There was a storm coming up at the time.

TENSILE STRENGTH OF ICE.—Herr Fruhling of Konigsberg, has given the tensile strength of ice at 23 degrees Fahr. as between 142 pounds and 233 pounds per square inch. Its compressive strength, found by cubes of over two inches at the same temperature, varied between 61 pounds and 204.8 pounds, a mean being 148 pounds per square inch. The small boy knows perfectly the average transverse strength of ice in thin sheets, and that without any elaborate investigation.

FLEXIBLE GLASS.—Paper of proper thickness is rendered transparent by soaking in copal varnish. When dry, it is polished, rubbed with pumice-stone and a layer of soluble glass is applied and rubbed with salt. It is stated that the surface is as perfect as glass.

THE AETERIDS, SO FAR AS KNOWN, NOW NUMBER 257. Dr. Palisa, of Vienna, discovered the last one of the number on the 5th of April. In our school-boy days, sixty years ago, the number was four—Ceres, Pallas, Vesta and Juno,

Pacific Coast Rainfall.

Special Bulletin of the Signal Service, U. S. Army, Division of the Pacific.

Stations.	Average Apr. Rainfall.	Rainfall Apr. 1886.	Average Season Ends May 1.	Total Ends May 1.
Tatoosh Island, W. T.	1.84	7.04	77.14	98.14
Spokane Falls.	1.20	1.20	103.96	105.16
Neah Bay.	1.83	1.20	37.77	48.97
Blackley.	3.10	2.37	42.10	45.47
Tacoma.	3.67	2.57	36.30	39.87
Port Angeles.	1.20	2.67	26.24	27.44
St. Townsend.	1.27	1.58	16.87	18.03
Olympia.	3.76	4.04	54.29	58.05
Walla Walla.	1.61	1.66	13.45	15.06
St. Canby.	2.05	5.40	46.67	50.29
Astoria.	4.90	4.99	70.13	75.03
Portland.	3.33	3.16	47.33	50.69
Rosburg.	1.23	4.58	20.40	21.63
Pleasant Grove.	0.90	0.93	8.74	9.64
Ashland.	1.38	2.63	20.80	22.18
Albany.	3.72	2.95	43.36	46.31
Crescent City, Cal.	8.57	8.59	83.70	92.29
Humboldt L. H.	3.41	6.73	30.82	34.23
Humboldt.	3.47	9.15	20.93	24.40
Cape Mendocino.	2.39	5.40	17.13	20.52
Weaverville.	3.53	3.51	39.62	43.13
Willits.	3.28	8.41	31.24	34.52
Red Bluff.	2.78	4.10	25.85	28.63
Tehama.	1.17	4.00	14.34	15.51
Chico.	1.52	1.52	19.55	21.07
Orville.	3.48	3.48	39.77	43.25
Orland.	2.90	2.70	14.17	16.87
Willows.	1.69	2.45	11.37	13.06
Princeton.	1.42	3.53	13.88	15.30
Fount Springs.	5.01	5.01	40.63	45.64
Colusa.	1.39	3.65	16.21	17.60
Westport.	7.77	7.77	49.40	57.17
Point Arena.	3.57	7.47	26.26	29.83
Maravilla.	1.43	5.66	13.62	15.05
San Francisco.	5.16	11.38	47.37	52.53
West Butte.	2.47	4.19	13.83	16.30
Nicasia.	2.75	4.93	19.54	22.29
Emigrant Gap.	5.11	5.11	47.73	52.84
Colfax, Cal.	5.00	10.56	42.64	47.64
Colusa.	3.35	3.35	34.11	37.46
Rochin.	1.83	1.83	18.34	19.17
Georgetown.	6.65	15.04	50.32	56.97
Placerville.	7.35	11.75	43.40	55.15
Shingle Springs.	5.84	5.84	32.58	38.42
Colusa.	2.28	2.28	21.67	23.95
Sacramento.	1.87	4.08	19.11	21.08
Galt.	2.12	3.58	14.50	16.62
Brighton.	2.51	4.16	15.46	17.97
Dunsmuir.	1.74	3.61	13.12	14.86
Woodland.	2.20	4.10	15.18	17.38
Davis.	1.50	4.75	16.15	17.65
Knight's Landing.	2.39	4.25	15.67	17.06
Elmira.	4.22	4.22	34.08	38.30
Ukiah.	1.91	6.45	32.91	34.82
Suisun.	1.58	4.02	19.12	20.70
South Vallejo.	2.20	4.82	15.75	17.95
Benicia.	1.58	4.76	15.19	16.77
Whiters (S. E. of).	3.82	7.12	31.69	35.51
Marina.	2.81	2.81	21.42	24.23
Paradise L.	1.97	3.62	16.68	18.65
Sonoma.	7.09	7.09	34.35	41.44
Petaluma.	1.93	3.74	17.46	19.39
Point Reyes.	2.61	2.63	17.84	18.45
San Rafael.	4.03	6.53	36.95	40.98
Ross Valley.	8.30	8.30	45.44	53.74
Saucelito.	3.34	5.21	24.13	27.47
San Geronimo.	3.27	3.27	20.93	24.20
Angel Island.	2.17	4.20	20.33	22.50
Alcatraz Island.	1.28	5.43	16.55	17.83
Presidio of S. F.	1.76	4.96	18.93	20.69
Pt. Mason.	1.76	5.23	15.12	16.88
San Francisco.	1.95	5.28	23.40	25.35
Martinez.	2.36	3.44	16.16	18.52
Brentwood.	1.80	1.80	9.03	10.83
Byron.	2.08	2.08	10.73	12.81
Antioch.	1.32	3.25	12.67	13.99
Stockton.	1.81	2.46	11.04	12.85
Tracy.	1.79	1.85	8.63	10.48
Farmington.	2.28	4.89	14.55	16.83
Yuba.	3.30	3.30	18.30	21.60
Modesto.	1.02	2.79	8.95	10.74
Turlock.	1.63	3.01	9.37	10.99
Oakland.	2.27	5.11	23.10	25.37
Piedmont.	4.15	4.15	16.15	18.30
Livermore.	1.38	2.36	13.24	14.62
Point Montara.	3.22	4.42	22.77	26.19
San Mateo.	1.50	2.91	14.52	16.02
San Bruno.	2.23	3.34	14.10	16.33
Ano Nuevo.	3.30	4.15	20.73	24.03
Pigeon Point.	3.04	5.20	15.43	18.43
Central Point.	1.25	1.91	9.07	10.98
San Jose.	1.94	1.94	12.41	14.35
Los Gatos.	1.86	7.12	18.84	20.70
Gilroy.	1.86	4.32	18.84	21.12
Wright's.	1.13	1.13	11.31	12.44
Apex.	5.14	5.14	23.37	28.51
Union City.	1.48	2.60	14.36	16.84
Pajaro.	1.48	5.25	17.37	19.85
Merced.	1.41	1.41	10.44	11.85
Athol.	3.18	3.18	16.68	19.86
Borden.	1.14	2.57	8.41	9.55
Firebaugh's Ferry.	0.94	2.45	8.15	9.09
Kingsburg.	1.48	2.45	9.74	11.22
Hollister.	1.14	2.55	11.15	12.29
Salinas.	1.21	3.83	13.14	14.35
Monterey.	2.52	3.39	15.40	17.92
Cinlar.	1.39	2.20	11.27	12.66
Soledad.	1.68	1.93	8.43	9.61
Bishop.	1.10	1.38	1.22	2.32
San Miguel.	1.01	1.85	7.45	8.46
Gosh N.	1.17	1.67	7.45	8.62
Tulare.	1.01	1.94	6.48	7.49
Lemoore.	1.15	3.35	9.19	10.34
San Luis Obispo.	1.10	2.45	20.38	21.48
Sumner.	1.35	1.35	4.66	5.59
Caliente.	1.92	2.65	9.96	11.88
Keene.	2.12	2.54	10.47	12.66
Richmond.	1.43	1.43	10.17	11.60
Mojave.	1.40	1.40	4.92	5.72
Santa Maria.	3.37	3.37	19.15	22.52
Guadalupe.	1.69	1.69	10.24	11.93
Point Conception.	1.51	3.40	16.82	18.33
Santa Barbara.	1.43	1.97	16.17	18.10
San Buenaventura.	1.36	2.70	11.10	12.46
Ravenna.	1.57	2.57	12.76	14.33
Newhall.	1.57	2.57	12.76	14.33
Northridge.	1.30	6.87	22.24	23.54
Cahuenga Valley.	1.91	3.00	18.76	20.67
Los Angeles.	2.00	3.32	16.86	19.86
Spadra.	1.18	2.85	11.87	13.05
Anaheim.	1.94	2.51	10.22	11.69
Orange.	1.06	2.00	15.74	17.80
Santa Monica.	1.09	0.66	11.67	12.76
Tucson.	1.11	1.11	9.24	10.35
Colton.	1.11	1.11	8.77	9.88
Redlands.	1.11	1.11	8.77	9.88
San Geronimo.	1.11	1.11	8.77	9.88
San Bernardino.	1.11	1.11	8.77	9.88
Indio.	1.11	1.11	8.77	9.88
Manhattan.	1.11	1.11	8.77	9.88
Yuma.	1.11	1.11	8.77	9.88
Poway.	1.11	1.11	8.77	9.88
San Diego.	1.11	1.11	8.77	9.88
Carson City, Nev.	1.11	1.11	8.77	9.88

USEFUL INFORMATION.

Water Color Painting on Silk.

As there is just now a great craze for painting in water colors on silk, the following directions as to how to do it may be of interest: The right silk to use for painting upon is gros grain of a good quality. The silk should be well strained on a frame and sized with either gilders' size, isinglass size, or colorless gelatine dissolved and diluted with water. Should the silk slacken in the frame after the size has been applied to it, it must be taken out, restretched, and another coat of size given to it. Drawing pins are the best things to use in fastening the silk to the frame; they should be put in close together, almost touching. The outline of the design should be traced upon tracing paper and transferred to the silk, using red carbonized paper and marking the outlines through with a fine crochet needle point. When the outlines of the design are clearly marked out, go over them with a brush filled with Chinese white and megilp, and afterwards fill all the design in with a wash of Chinese white and megilp, going over every part without reference to the color afterwards to be painted. Then paint your design, coloring it as wished. When painting it very light colors and shades, mix them with a little turpentine and copal varnish instead of megilp; for the darker tints use megilp. Mix nearly all the colors with Chinese white, paint as in body colors, putting few shades or tints in, and making those strong and light; too much fine work, shading and painting up gives a patchy, blotchy effect to the painting and spoils it at once. Put in autumn tinted grasses and leaves behind the gaily tinted flowers. These serve to give a background to the picture and much improve it. They are painted with the wash of Chinese white and one tint of Indian red, neutral tint or light red passed over them. A "fixatif" to be blown on after the painting is finished, is considered to preserve and set water color drawings, but it is hardly necessary to employ it when size and megilp have been used. Whits wax is sometimes applied to water color painting; it gives a highly polished appearance to the painting. It is well diluted in alcohol until it is as thin as milk, then brush over the work with a varnish brush, and when dry rubbed with a silk handkerchief.

STEAM HEATING.—It is an interesting fact that while a large number of towns in the United States have steam heating companies in operation, none of them publicly report that a profit is being made. This fact has occasioned some surprise, and not long since we had opportunity to ask some questions, of persons who are supposed to know, in regard to the inside workings of the companies. One of them, it was said, is making money, but it is supplying gas to the town as well as steam, and as the accounts of both departments are kept together, it cannot be said that the steam heating pays. This company has a greatly reduced outlay, because its managers were experienced in pipe-laying before they undertook supplying steam. The experience of the different companies, even if known, could hardly be a reliable guide to others attempting business. No two of the companies seem to have found their greatest losses from similar causes, and yet there is sufficient similarity to make some conclusions plain. A reliable steam meter is much needed. Without this the work will be anything but profitable, no matter how the companies may be managed.

STILL ANOTHER NEW TELEPHONE.—Mr. J. T. Guthrie, of Leesburg, Ohio, has invented a telephone which has been tested by many different parties, and it is said, all claim for it the superiority it possesses over other inventions. This telephone is operated by a distinct current of electricity, and not by induced currents, as are others, and no induction coils are needed. The articulation of speech is made by a natural and mechanical disturbance of the current of the positive and negative poles, which are brought near to or in contact with the diaphragm. One pole is made of a close and compact natural production of the earth, and is a good conductor; the other pole is of an open and porous nature, and not a good conductor; consequently the natural and unnatural poles make a natural disturbance, making it the most sensitive transmitter possible to make. The transmission is made by the disturbance of the electrical current at the poles by opening and closing the circuit (as is the case in telegraphy), which is done in his system by simply speaking against the diaphragm, which causes the current to open at every sound uttered against it.

THE PASSAGE OF STEAM.—The passage of steam into either end of a cylinder may be very distinctly heard by putting a rule, a piece of wood or a piece of iron between the teeth, stopping the ears with the fingers, and putting the free end of the piece of wood or iron against the cylinder. Both ends of the cylinder may be "heard" in turn; both pillow blocks may be tested in the same manner for lost motion, and the steam chest may be tried for lost motion in the valve connection. A great deal is to be learned by "hearing through the teeth;" try it.

TOADS AS BEE EATERS.—The toad may be useful in kitchen gardens as a slug and insect destroyer; the freer you can keep your apary

from his presence, the better. Toads will wait at the foot of a hive to seize any honey-laden bee that may happen to fall to the ground on its return from foraging, and one bee master, says a correspondent of the London Graphic, saw over a dozen little workers captured in the space of half an hour by an old fat fellow, who darted out his tongue with wonderful celerity, immediately he saw a bee on this ground. The bees had been collecting pollen, and many of them, being heavily laden, were unable to reach the floor board of the hive.

PHOTOGRAPHING IN THE DARK.—With a lens made of rock salt, it may be possible to photograph in the dark. The *Photographic News* states that Abney has succeeded in preparing plates which are sensitive to the rays lying beyond the red end of the spectrum, the dark heat rays, and with such plates used with a rock salt lens, there should be a possibility of photographing bodies which possess a high temperature, although that temperature may be far below that needed to render them self-luminous.

DETECTION OF MINUTE TRACES OF COLOR.—Interesting experiments have been made by E. L. Nichols on the quantity of coloring matter which must be mixed with a perfectly white powder (carbonate of magnesia) before the human eye can detect it. From these experiments it appears that red and yellow are most easily detected, 16 and 17 parts respectively being sufficient for detection when mixed with one hundred million parts of white powder.

HORSE-POWER.—The term horse-power is incorrect, because it does not express the actual power of an average, or even an exceptional horse. This really makes no difference. The animal should be entirely eliminated from the mind, and the term taken at its exact meaning, viz., the raising of 33,000 pounds one foot high in one minute of time. A horse would fall far short of doing this for ten hours a day; a steam engine will do it for 24 hours.

A COSTLY TEMPLE.—St. Peter's Cathedral, just finished at Moscow, has five cupolas, and 900 pounds of gold were used in overlaying them. The doors of the temple cost \$310,000, and the marble floors \$1,500,000.

THE COMPARATIVE COST.—The United States and Germany have about the same number of war vessels, yet our navy cost us \$17,292,601 during 1884, while the Germans expended on theirs but \$6,752,094.

THE KNIGHTS OF LABOR count among their colleagues one Governor, one United States Senator, three Congressmen and 125 members of State Legislatures.

GOOD HEALTH.

Baths and Bathing.

Ancient history, both sacred and profane, frequently tells of the baths used of old as a means of health, refreshment and luxury. Pharaoh's daughter went to the banks of the Nile to perform her ablutions. The classic poem describes Andromache as having a warm bath awaiting Hector, when he should return from battle. Penelope, as a panacea for her distress, because of the protracted absence of her husband, availed herself of the soothing bath. Some of the most beautiful figures of the Bible describe the bath, as it was applied at the time when the Saviour was on earth and during the patriarchal age. Ablutions and immersions were undertaken as a method of purification.

The ancient baths of the Egyptians and Persians were famous for having brought every artificial aid refined sensuality could suggest to make them luxurious; and the Roman baths, wherein the old philosophers passed so much time in alternating ablutions, with conversation and athletic exercise, have been described by novelist and historian.

Hot Air Bathing.

Hot air bathing, though highly estimated by the inhabitants of Greece, Rome, Turkey and Russia thousands of years ago, had apparently been unpracticed by the people of England until 1854, when David Urquhart and Dr. Richard Baxter introduced the dry bath into Great Britain. Since then few of the principal cities of that country have establishments for giving Turkish baths. Dr. Shepherd first introduced the Turkish bath in this country.

At this season of the year, when the first natural instinct is to keep the body cool, fresh and sweet, the bath is a grateful topic, especially since it has been brought to such a pitch of marvellous perfection. All persons should be made to understand how the sluggish impurities of their blood may be so moved, their spirits raised, their systems toned up, and (precious boon to women) their complexions cleared and beautified by frequent and judicious recourse to the hot air bath.

No intelligent person needs instruction concerning the functions of the skin—that wonderful regulator of the body it encloses; nevertheless an occasional ordinary bath, or a sponging off is too often supposed sufficient for the maintenance of cleanliness. It is a hideous and lamentable truth that the majority of persons are

never thoroughly clean, and never perfectly realize the importance of keeping the skin in an active state.

Those who have not had the impurities of their systems gently expelled by the hot air bath, are always amazed and sometimes appalled in the first trial by the amount of "scarf skin" which is rubbed off during the process. Indeed, they are quite apt to leave the bath, reflecting with the poet:

"Tis clear that Nature doth require,
Seasons and times of cleansing, which, perforce,
I, her frail son, among my brother mortals,
Straightway must give attendance to."

Horace Greeley once said that he never arrived at the dignity of being perfectly clean until he took a hot-air bath.—*E. r.*

How and When to Eat.

Directions for Perenns Delectans of Avoiding Indigestion.

Never eat food when not needed, simply to save it, for in doing so, it is twice wasted. It is thrown away in the stomach, as it is not transformed into health and strength, but becomes a source of disease and suffering. It had better be thrown upon the land, to reappear in the form of vegetation.

Never eat at bedtime, nor when very much exhausted, nor in great haste, for in so doing the seeds of dyspepsia are easily sown. If you have not time to eat a fair meal properly, you will gain by eating just what you can eat like an intelligent being, taking it so moderately that it may be well chewed and mixed with saliva, so that it may be digested, as that only is of any importance in the promotion of health and strength.

Never harbor the foolish and absurd idea that the richer your food is in grease, spices, the sweets and the like, the more nourishing it will be; for the plainer food contains the most available nourishment, bread being the "staff of life." The complicated dishes are often so difficult of digestion that even less strength is obtained from them than from one-half of the quantity of plain and substantial food, while some kinds of so-called rich foods exhaust more strength—in the vain attempt to digest them—than they can afford, making an actual loss!

Never hurry unnecessarily, or attempt to do more labor than you can fairly do, unless sure of having ample time in the future to rectify errors or to be sick!

Never eat between meals, not even of fruits, if you are at all troubled with indigestion or are willing to become a dyspeptic at some time. No amount of hard work will justify lunches, as the stomach cannot digest food when taken so irregularly, nor well dispose of more than three meals each day.

Never take ice cream or ice water at your meals, or during the digestion of them—within four hours after taking them—when satisfied that a "cold dinner" will prove unfavorable in your case, as ordinary food is never half as cold as these articles! (It is not necessary to be governed wholly by our tastes, especially when that is vitiated by bad habits.)—*Golden Rule.*

Wheat Meal—Its Preparation and Healthfulness.

R. T. G. writes to the *Dietetic Reformer* that he has induced his miller to produce wheat meal ground as finely as possible, without injury to its baking quality, which it appears is done by what is technically called "low grinding," i. e., setting the millstones too close. I enclose a sample and also a specimen of the bread we make from it, by means of soda and buttermilk, baking at a low temperature. It is the best bread I have ever met with. The meal is made from fine white wheat. I place this bread at the head of all articles of food.

I am more and more surprised, by lengthened experience, at the small quantity of food necessary after the period of our growths had passed. I used to think that stimulants were the chief cause of the undue shortening of human life, but am now convinced that infinitely more damage is done by ignorance of the amount of food required to make good the wear and tear of our bodies. When the appetite fails, we take to condiments, sweets and intoxicants, thereby inducing gout, rheumatism and various other diseases. I have seen, perhaps, 100 men of my acquaintance cut off at 50 or 60, in the very height of their usefulness, simply because they thought it necessary to eat as much after 30 as while growing. * * * I am strongly of opinion that the most suitable as well as enjoyable food for those who do not live by the sweat of their brow, is a combination of grain and fruit, with milk, butter, tea, coffee, eggs, by way of luxuries. Upon such food I live, at the age of 57, more mental and almost as much physical vigor, as at any former period of my life.

ARSENIC AND MALARIA.—S. H. Davey of Cornwall, England, confirms Dr. Tomassi Crudelli's opinion concerning the effect of arsenic in preventing cholera and other zymotic diseases. Although during the last 40 years many cases of cholera, fever, smallpox, etc., have occurred in the country surrounding the extensive arsenic works at Bissoe, not a single case has been known within about two miles of the source of the deadly fumes.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador *Ledger*, May 15: The prospects of starting the Mahoney are less encouraging now than for a long time. Over a month of good weather has passed, and still nothing done, and from all indications nothing will be done. G. W. Horn, the foreman, has gone to his home in Sonoma county, in all probability to remain. E. Harrington is still here, but gives little hope of starting. The Wildman mine has been bonded by John Tregloan, sen., for 90 days. From what can be learned the property was bonded in the hope that the Mahoney would be worked, which would facilitate the working of the Wildman. In the event of the Mahoney failing to start up, the Wildman is also likely to come to naught. Drifting at the Eureka is progressing satisfactorily. The course is now east, with the intention of striking the hanging wall. The Lincoln mill is running to its full capacity, with plenty of rock in sight to run for a long time yet. The boys were paid off this week.

RUNNING BY WATER POWER.—Grass Valley *Union*, May 13: The Empire pumping and hoisting works are now running regularly by water power, and there will be no further use for steam, barring accidents to the water supply which are not likely to occur. The water-pipe line, which is over 13,000 feet in length, is found to be perfect in all its parts, there having been but slight leaks, which have been closed, when discovered. Since the water was turned on, the pipe-line has been carefully inspected day after day, and it is found to have been laid down in a superior manner. The water will be turned on at the mill as soon as the additional head of twenty stamps are ready to drop. Three 6-foot Pelton wheels are used for the respective duties of hoisting, pumping and milling.

MORE WATER POWER.—Now that water-power has been introduced to the Empire mining works, the next move will be to extend a 13-inch pipe-line from the Empire to the North Star mine. This mine will be connected directly with the 22-inch main line, which will give at the North Star a pressure of over 650 feet from the source at the head of the main line. The contract for laying this line has not been made yet, but it is expected to be in a short time, and the work will be completed in the next few months.

El Dorado.

GOLD.—Placer *Herald*, May 15: One day last week 122 ounces of gold were brought to Auburn from the Zangraf quartz mine near Wild Goose Flat, El Dorado county, being the result of three weeks' run. This represents about the average yield of the mine.

Inyo.

CERRO GORDO.—Inyo *Register*, May 13: The Ygnacio company has been working quietly, but to some purpose, for several months. "For a fact" they have shown the old mine to be a first-class property. They have opened a bonanza of rich silver-lead, or smelting ores, lying about 400 feet below the old works, and below the Potosi tunnel. During the time they have run over 400 feet of tunnel and drifts, finding ore almost continuously, but taking out none except what was necessary to the progress of the work. The ores (specimens of which we have) are beautiful carbonates and oxides of lead, carrying an average of 50 per cent lead, and 100 ounces silver per ton, as definitely ascertained through constant tests by a competent assayer, S. D. Woodhull, M. E. They have also taken out some 30 tons of 300-oz. silver milling ore from the old upper works, and the old dumps are proving to be a good mine in themselves. Over a hundred tons of fine milling ore have been taken from one of these dumps alone, and three-fourths of it is yet to be sorted over. It is astonishing how much good ore was thrown over in these dumps. Six first-class sorters are kept at work upon them all the time. Geo. Weise is underground foreman, and is said to be a most competent man. Geo. M. Hawley, son of the principal owner, is in general charge. He has a small force at work on a mine called the Aries, which is daily producing a paying quantity of high grade ore. Mr. Gordoites has commended himself to the Cerro Gordoites generally. The Union, Omega, Uncle Sam and several other mines, are producing considerable quantities of lead ores, most of which is shipped to San Francisco. Altogether, mining prospects in Cerro Gordo are very encouraging.

PANAMINT.—*Independent*, May 15: A good deal of progress has been made on the rebuilding of the works at Panamint. The mill frame is nearly completed and much of the machinery is in place. A great deal of labor was required repairing damage done to machinery by the fire that destroyed the works years ago. A good deal of new shuffling, steins, cams, shoes and dies will be required. The mortars are as good as ever. The engine and boilers have been put in thorough repair and are ready for work at any time. During the winter months much delay was caused in getting in freight by snow on the mountains. Now work can be pushed more rapidly. A shipment of a few tons of ore was made last Saturday, from a prospect belonging to J. C. Irwin, and located east of Alford. Barnes & Kehoe made a shipment of two carloads of ore this week. Kehoe reports the mine looking well, and the probabilities are that another shipment will soon be made.

Napa.

WORK RESUMED.—*Calistogan*, May 15: Work has been resumed in the long tunnel on the Red Cloud claim in King canyon, owned by Dr. Smith and others. Three men are employed, and we understand that others will be set to work soon. A miners' house, 12x20 feet, is also being erected on the claim for the accommodation of workmen. The tunnel, if we remember correctly, is 80 feet long in very hard rock, and it is supposed that by drifting 60 feet further, at most, the desired vein of ore will be cut. We hope the parties interested in the work will meet with success.

Nevada.

BOSTON.—Grass Valley *Union*, May 9: After fighting water for some weeks, which increased greatly from the heavy rains of April, underground work has been resumed in the Boston mine, and the shaft below the 230 level is being sunk for another level. The rock in the shaft is rich in free gold, and the 230 level is showing up finely. Chas. E. Uren, civil engineer, has made a very handsome and elaborate map of the mining properties of the North Banner Consolidated Tunnel Company, showing the extent of the underground workings, mill site, the water-power resources and all the surface surroundings. Frank Chesneau's little 3-stamp quartz mill, on Wolf creek, is running constantly on custom rock. The directors of the Horseshoe Mining Company will hold a meeting in a few days and determine upon the time of starting up the mine which has lain idle during the winter. It is thought that work will be resumed between the 1st and 10th of June. The pumping and hoisting works are in good condition for service.

SLATE LEDGE MINE.—*Tidings*, May 14: Francis & Co. are working the Slate Ledge mine (Perrin's) under a lease. They find the ground there very easily worked and the ore can be cheaply mined. The ledge is about four feet thick. In a week's time the miners have taken out 40 loads, and the estimate of good judges is that none of it will pay less than \$30 a load and some of it will pay \$50 a load. We call that a pretty good show for a mine.

Placer.

PAYING.—Placer *Republican*, May 12: The Zangraf mine down on the American river continues to pay well and is one of the best mining properties near Auburn. With the exception of the dry weather in the summer, when water is scarce, it has continued to pay handsomely at every cleanup since January, 1883. Last Thursday 122 ounces were brought in from the mine from a three weeks' run. On April 16th the cleanup returned 101 ounces, on March 24th, 91 ounces, and on March 3d, 119 ounces. The cleanups are made about once in three weeks and average about the same as the above figures. The Bob Lewis mine at Damascus is still turning out rich gravel that pays from \$8 to \$10 a carload. Work in the Mountain Gate mine is being pushed with the usual good results, and rich gravel has been struck in the Lebanon mine at Prospect Hill. The difficulties between the owners of the Big Oak Tree and Rising Sun mines at Colfax have been settled by pooling the properties and placing the whole under the management of W. B. Hayford, with the privilege of sale.

San Bernardino.

DAGGETT.—Cor. Calico *Print*, May 15: The news from Rattler district, 30 miles south of Cadiz station on the A. & P. R. R., is encouraging, so Mr. Heald, the secretary of the company, informs me. The mill is working well, but lacks capacity, and 5 stamps will be added immediately. In the waiting for the enlargement of the mill the force of men from the mine are engaged sinking on the well for the larger supply of water which will be needed. Robt. McCueston's teams are making two trips daily hauling lumber and machinery for the Runover mill. The Daggett mill is pounding away on Blackfoot rock this week. Some work also doing at the Sampling Works. The Oro Grande mill keeps constantly at work on Waterloo ore with good results. Your correspondent was shown by C. J. Perkins some lead buttons taken from some newly discovered mines, about six miles east from Keene's station in the Tehachapi range. The ledges are said to be very large and well defined, carrying over 50 per cent lead and about \$20 silver per ton, with plenty of wood and water in the near vicinity. Mr. Perkins left last Monday to take a look over the property. Rumor has it that J. B. Osborne has gone to San Francisco to conclude a sale of his Ord and other property. Should they be realized, Daggett would be the main reduction and shipping point, adding greatly to our already large shipments of bullion from Calico and surrounding camps, for there are thousands of tons of medium copper, silver and gold ores already extracted, and in sight in some dozen or more huge ledges upon which a great amount of sinking and tunneling has been done. Old Ord is almost a mountain of ore, and when she does commence she will make things lively.

Sierra.

THE COLOMBO.—*Tribune*, May 15: The contractors at the Colombo mine completed the raise the first part of this week. Everything concerning the mine is kept very quiet, but, nevertheless, it has leaked out that the ledge is looking fine and that there is, beyond all doubt, enough in sight to warrant the company in resuming operations. We are informed that as the raise is now through, men will be put on to drive ahead on the ledge. Arnott, Moore & Co. are making preparations to start a tunnel at their gravel claim between Eureka and Brandy City. They will have to run about 3000 feet to reach the channel at the point where they intend to tap it. Ingersoll drills will be used in the work.

Siskiyou.

ORI FINO.—Cor. Yreka *Union*, May 15: Since my last writing, having a little leisure time, occupied the same by taking a stroll in and around the quartz mines of this place. The first that came under my observation was the one owned by Messrs. Ladd and Clemens of New River and D. A. Corson of this place. This ledge was purchased by the aforesaid parties about one year ago. It is a well-defined ledge. About 200 tons of ore have been taken out and crushed within the last year, yielding \$8 per ton. There is considerable ore in sight. The ledge can be traced almost the entire length of the claim, and prospects well wherever tested. The next in order, in an adjoining ridge, is the lode owned and worked by Messrs. Connor, Lenard and Callahan. This mine turns out very good rock, the same being crushed in an arastra near the claim. From former tests and prospects of ore they are now extracting will show a result of \$20 per ton. The next, further up the ridge in a westerly direction, is owned and worked by Messrs. Lindsey & Sons. They have out about 50 tons of ore and intend making a crushing soon, from which they anticipate handsome returns. About a mile farther west is the mine owned by A. M. Johnson. I learn considerable bullion has been taken from the ledge and prospects of much more being taken out. He has out about 100 tons and contemplates hauling and crushing soon; about \$30 a

ton will be the result. There are other ledges in the vicinity of those mentioned, which no doubt would prove remunerative if properly handled. Ori Fino, like many other places, needs capital and energy to thoroughly develop the hidden wealth in and about the place.

Trinity.

DEADWOOD.—Cor. Trinity *Journal*, May 12: The most recent strike is that of Wm. McLiman, jr., and John Kemp on the A. B. mine on Thorn Gulch. From their dump pile I took an average of the ore amounting to three pounds, which yielded \$1.25 in free gold. The ledge is from two inches to one foot in width, carrying well-defined walls. This property was purchased from Otis Collopy and Chas. Clements for the extraordinary sum of fifteen dollars. One week after the purchase they were offered \$7000 for their property by the same parties. All the fools ain't dead yet. Jud and Walter Van Matre are the owners of the most promising mine in Deadwood. The ledge is from six inches to two feet in width in the stopes, which average over \$100 per ton; the formation, reasonably soft, enabling them to extract ore at a very lively rate. Jud was the finder of this little gem, which was discovered near the roots of an oak, and as Jud says himself, it is not for the beautiful shade on that summer's day, perhaps this treasure would be still hidden. Wm. Blagrove is taking out some of the boss ore, and from every indication will for some years to come. Frank Belleau & Co. have suspended work on their mine for a few weeks, making preparations for machinery, etc. Collopy & Kearney leased the Sunrise mine some time ago, and after doing considerable work, in the way of prospecting, are now stopping out \$700 ore from a good-sized ledge. I hear that Geo. Van Matre and Mike Ramm have struck a very rich vein.

Tuolumne.

EXPERIMENTAL.—*Union Democrat*, May 15: The Experimental mine, located in the vicinity of Columbia, was visited some six weeks ago by Mr. Louis Blanding, who made a thorough examination of it, and reported favorably on it to certain parties in San Francisco. The information obtained by him on the ground, and the results of his tests of the ore made on samples taken by himself, convinced him of its present value and future possibilities when properly developed and worked on a large scale. The location is peculiarly good for rapid development and economic and profitable working. The information thus gained and the favorable opinion he expressed came to the knowledge of other parties who acted upon it, and the mine has been conditionally sold for \$33,000 on a bond of four months, as we learn from authentic and reliable source.

STOCKTON MINE.—It is probable that the Stockton mine, situated about a mile from Sonora, and which has experienced quite a spell of idleness, will be restored to activity. The mine is thoroughly equipped, and has yielded some very fair ore. Mr. Mark Lane, of Stockton, one of the owners, has several men engaged in prospecting the mine with a view of further development, and if possible to tap the same. The presence of water in this mine has been a source of great annoyance and expense in its working. If Mr. Lane's tapping project proves successful, avoiding the only obstruction that will be, the mine can be made a very profitable property, even at a low grade of ore, as the machinery for working the mine is all on hand.

A NEW QUARTZ VEIN DISCOVERED.—Hubert Shaw brought to town this week some very good-looking quartz from a vein he discovered about a week or ten days ago. The vein as far as explored is 18 inches wide, and situated six miles from the town of Groveland. The quartz shows good freely, and it is thought will mill about \$30 per ton.

A GOOD STRIKE.—Monday week, Messrs. John Noonan, Capt. Knowls and Ed. Martin struck a \$260 pocket in their mine on Campbell's Flat. Mr. Noonan informs us that the mine is looking very promising, and chances for another pocket very flattering.

CHANGED HANDS.—The Mississippi mine, near Big Oak Flat, upon which a mill has just been erected, has lately changed hands, the former owners, Jutson & Co., having sold the mine to Messrs. Horwell & Co.

NEVADA.

Washoe District.

CHOLLAR.—*Virginia Enterprise*, May 15: The daily expected orders to resume sinking the Chollar-Norcross-Savage on Combination shaft were received, and in compliance therewith work to that effect was actively commenced on Tuesday. The dump has been cleared of accumulated debris and sediment, the pump connections arranged, and the actual work of sinking deeper is now being commenced. The shaft was 3155 feet deep when sinking was suspended, therefore 45 feet farther will carry it to the 3200 level, the present objective point. Thence a drift west and north will be sent out to meet that coming from the bottom of the Hale and Norcross deep winze on the 3200 level. As the bottom of the shaft when it reaches that level will be nearly or quite into the easterly dip of the vein, very little westward working will be required for the Hale and Norcross connection, although it is the intention to push a main west drift or crosscut from the shaft through to the west wall of the ledge. No crosscutting as yet on the 3100 level of Chollar.

SAVAGE.—After a rest of about five years, direct work was resumed in this mine on Wednesday last, at the north line, from the 600 level of the Gould and Curry mine, continuing the main lateral south drift of that mine, which had reached the Savage line. The drift commences from the line in low grade ore, which is expected to develop into something better as the drift progresses. It is to be carried through to connection with the main Savage shaft, the debris removed at present being taken out through the Bonner shaft by arrangement with the Gould and Curry Company. Should circumstances, however, justify, the Savage works will be started up before long, and the regular hoisting, etc., done through it. The Savage Company have been combined with Norcross and Chollar in the deep middle mining explorations, and now they propose having a little side-show of direct work themselves.

POTOSI.—The diamond drill hole, commenced 40 feet north from the face of the main south lateral drift, on the 3100 level, mentioned in last week's report, was sent out 117 feet east into the ore vein,

but it finally got into a peculiar clayland quartz-seamed formation, which clogged and twisted the drill so that it had to be withdrawn for fear of breakage. The drillings showed a considerable quantity of black sulphurets of silver, which was expected, it being the same ore vein which runs through the lower levels of the Hale and Norcross and Chollar. At noon, day before yesterday, the diamond drill was started at a point 75 feet further north, and has now made a good commencement east toward the ore vein. It will be into it shortly, and be sent through to the east wall unless the formation prevents. But little water was found in the other hole, and none in this.

HALE AND NORCROSS.—On the 2900 level the main north lateral drift is gaining near proximity to the Savage south line, and will be continued into that mine when it reaches it. Good indications of a paying ore body are found to the west of this drift and is liable to turn out, as was thought some months ago when work was progressing at this point, to be the making of a genuine paying ore body extending into the Savage. The explorations in the ore body above the 3100 level have extended to the west side of the vein, and from the openings made a good supply of ore can be daily taken out when required. As soon as practicable or expedient the drift from the 3200 level or bottom of the deep winze will be opened and carried through to connection with the Combination shaft, which is now being sunk deeper for that level.

GOULD AND CURRY.—On the 600 level the upraise at the south line, next to the Savage, has reached an altitude of 57 feet above the track floor, the top or face being in low grade ore. It is to be carried through to connection with the old workings on the 400 level. At a point in this upraise, 45 feet above the track floor of the 600 level, crosscuts east and west are started, both in low grade ore or strongly mineralized vein matter. These fine ore bonanza indications developed at that point have induced the Savage Company to run a drift into their mine, or rather to continue this Gould and Curry drift on the 600 level, the privilege being granted by the Curry Company. The drift north in Curry on this level is making good advancement in favorable-looking vein porphyry with seams of quartz and clay.

ALTA.—Crosscutting was commenced last Monday on the 700 level. The face of the main north lateral drift on this level was expected to reach and connect with the old Lady Washington workings by this time, but a resurvey shows that there are a few feet further to go yet. The main west drift from the shaft is 500 feet in length, and the north lateral drift, which was started at or near its face, is 800 feet in length, following along the east side of the ore vein. One hundred and fifty feet from where this main lateral drift leaves the west drift is where the first crosscut was started. It is in ten feet and has cut into a body or streak of good pay ore. Another crosscut (No. 2) west has been started about 40 feet further north, which is in a few feet and is expected to strike the same vein of ore as found in crosscut No. 1.

BEST AND BELCHER.—The water still continues to be held stationary at the point 2335 feet below the surface or collar of the Osbiston shaft, where a tank station has been cut out and a new tank and donkey pump put in operation to aid in deeper operations. This work is completed, and on Monday next the drainage work will be resumed, lowering the water to reach the bottom of the shaft. Meanwhile an air pipe is being carried through to the C. and C. shaft, by way of the Suro tunnel, to bring an air supply from the compressor at the C. and C. works to run the donkey engine.

YELLOW JACKET.—Daily yield 140 tons, keeping the Brunswick mill steadily supplied. The ore from the 1300 level up is worked to advantage by the concentrators in use at the mill, but above the 400 level chloride ore predominates, which no concentrators can save or concentrate. As has already been shown in these columns, patent concentrators are of no use in chloride ores, which compose about seven-eighths of the Comstock ore formation.

CROWN POINT AND BELCHER.—About 375 tons is the present daily yield. The old ore sections are showing fairly, there being enough in sight in the various stopes and breasts to keep the mills running for a year or two at least.

CON. CALIFORNIA AND VIRGINIA.—Daily yield 375 tons, showing a value of about \$12 per ton according to battery sample assays at the Morgan and Eureka mills. On the 1400 level the drift running southwest from the main west drift has been extended 49 feet, making a total length of 848 feet.

MEXICAN.—On the 700 level the north lateral joint Mexican and Union drift from the Ophir shaft has attained a length of 196 feet. The northwest drift from it, in Mexican ground, is in 114 feet. Faces of both drifts in favorable-looking vein matter.

SIERRA NEVADA.—On the 520 level west crosscut No. 2 has been extended 41 feet, making a total present length of 597 feet. The formation continues to be hard quartzite and porphyry, with a slight seepage of water.

UNION CONSOLIDATED.—On the 500 level further explorations are suspended, and work concentrated upon the advancement of the joint drift now being run through the Mexican into this mine.

KENTUCK.—Daily yield, 60 tons of low grade ore from the old upper workings. There is plenty of this ore in sight to run on for the next year or two.

OPHIR.—On the 400 level the crosscut explorations east and west are making good progress, with no new features of interest to record.

MONTE CRISTO.—The drift west from the new shaft, 150 level, is advancing slowly in a very hard quartzite and porphyry formation.

Como District.

MORE ORE.—*Virginia Enterprise*, May 15: Ed. Swift, of Gold Hill, hauled two wagon loads of ore from the Como-Eureka mine, Como, to the Thompson mill, Lower Gold Hill, day before yesterday for reduction, and two more loads yesterday, making in all about 16 tons. This lot has been hauled as a fair sample of the ore in the mine, and its reduction at the mill will give a square test of its general value. The Symonds brothers have been actively exploring and pumping up the mine during the past winter, and show a large dump of fine-looking ore as the result of their labors. It is most certainly

to be hoped that the returns from this test crushing will prove satisfactory and show that there is a second paying mine in Como.

Dun Glen District.

PURCHASED THE BLACK HAWK MILL.—*Silver State*, May 13: Sheriff Fellows disposed of the Black Hawk mill yesterday to S. M. Hendra, of Dun Glen, who intends to remove it to that place to work ores from a gold mine which belongs to him and Steve Thomas.

Eureka District.

ACTIVE OPERATION.—*Eureka Sentinel*, May 15: Work will be resumed at the Richmond reduction works about June 1. Two furnaces will be fired up. The Hecla mine at Mineral Hill, this county, shipped a ton of ore to the Eureka Con. works last Thursday. The roads leading to town from the various sections of Eureka District are now in good hauling condition. From the Whippoorwill mine on Prospect Mountain 3 tons of ore were shipped to the Richmond reduction works last Tuesday. The Comet mine in New York Canyon made a shipment of 2 tons of ore to the Richmond reduction works the other day. Six tons of ore were shipped from the Giant mine on Prospect Mountain to the Richmond works during the first part of the present week. The Kentucky mine on the western slope of Prospect Mountain made a shipment of 1 ton of ore to the Richmond reduction works the other day. Sixteen tons of ore were received at the Richmond reduction works from the Iron Clad mine, Secret Canyon, during the week ended yesterday. But four miners are now employed in the Phoenix mine on Ruby Hill. From the property 26 tons of ore were shipped to the Richmond reduction works during the week ended yesterday. The Lizzie L. and Alexandria mines on Prospect Mountain made shipments of ore during the week ended yesterday to the Eureka Con. works. The former shipped 15½ tons, the latter 3½. It is hardly probable any work will be done in the Albion Con. mines until after the expiration of the time in which the properties as sold by the Sheriff yesterday are subject to redemption. Quite a number of Adams Hill properties have showed up well the past week, the Bowman having shipped to the Richmond reduction works 7 tons, the Frazier and Molino 15 tons and the Bullwhacker 14 tons. Of the Ruby-Dunderberg properties, the Lord Byron and the Dunderberg mines made shipments of ore to the Eureka Con. reduction works during the week ended yesterday. The former sent down 10½ tons, the latter 19. The Marguerita mine on Adams Hill continues to produce good quantities of ore. On Tuesday last 5½ tons were shipped to the Eureka Con. reduction works. The Silver Lick mine, an adjoining property, also made a shipment to the same works of 4½ tons. The work of sinking a double compartment shaft in the Paul Pry mine on Adams Hill, that was commenced ten days ago, is progressing favorably. The outlook for this property, that is said by practical miners to be one of the best in that locality, is very good. The work of excavating a suitable foundation for the new machinery in the Eureka Con. hoisting works is a larger job than many suppose. Even with the large gang of men employed thereon, the work of draining the mine will hardly commence before the 10th of August.

THE ALBION CON. PROPERTIES SOLD.—*Sentinel*, May 15: The mines and other properties of the Albion Consolidated Mining Company were sold yesterday in front of the Courthouse by Sheriff Stinson under and by virtue of an execution issued out of the District Court in and for this county, to satisfy judgments against the corporation to an aggregate of over \$60,000. The Uncle Sam was sold for \$37,000; Albion, No. 1, \$5,000; Albion No. 2, \$5,000; Albion No. 3, \$1,000; Albion Con., \$100; Moss Agate, \$100; Price, \$500; Davis, \$100; the improvements on the Albion and Uncle Sam, \$1,500; improvements on the Price and Davis, \$1,500; Albion hoisting works, \$180; machine shop, \$100; lodging-house, \$400; furnace plant, \$330; brick store, \$500; Uncle Sam shaft-house, \$142.15—making an aggregate of \$58,431.15. With the exception of three or four items, the purchases were by the Richmond company. The above are subject to redemption any time within six months. To make such redemption would cost \$68,948.65.

Freiberg District.

ORE.—*Eureka Sentinel*, May 15: A sack of ore weighing 117 pounds was brought in from one of the mines of Freiberg District, Nye county, to the Eureka Con. works the other day, in order to test its value.

Garfield District.

A RECENT FIND.—*Inyo Independent*, May 15: Very rich ore is being taken from a recent find in Garfield district. The claim is joining the location of Farington Brothers, about 16 miles west from Soda Springs station of the C. & C. railroad. A carload of the ore sent to Selby & Co. netted \$300 a ton. Since then ore has been found that goes from \$500 to \$10,000 a ton.

Jackrabbit District.

DEVELOPING.—*Pioche Record*, May 8: The Onondago claim, being opened up by Wes. Williams at Jackrabbit, is said, by those who have seen it, to be developing grandly. The ore in the ledge is two and a half feet in width, and all express the belief that it is leading to an immense ore body. Out of a dozen or so assays made, the lowest, made from the casing material, went \$17 in silver and 59% lead, and the highest went over \$51 in silver and the highest in lead 74%. The other assays ranged from \$31 to \$48 in silver. At the rate of the price of lead at present, this ore can be shipped to the furnaces in Salt Lake City at an immense profit. This mine, from the character of the ore bodies of that district, is almost certain to develop a huge body. This mine is owned by Williams, Welland & Co.

Jefferson District.

MILL.—*Belmont Courier*, May 8: The Harrison Brothers' mill at Jefferson is running steadily and doing good work.

Northumberland District.

LAST CHANCE.—*Eureka Sentinel*, May 15: Three tons of good ore were received at the Eureka Con. works from the Last Chance mine, Northumberland District, the other day.

Peavine District.

GOLD ROCK.—*Belmont Courier*, May 8: J. R. Seymour brought in some rock on Sunday from

Peavine which he thinks carries gold. It is his intention to have it tested.

Revello District.

NORRIS ORE.—*Eureka Sentinel*, May 15: Half a ton of good ore arrived at the Eureka Con. reduction works from the Norris mine, Revello District, Nye county, on Monday last.

ARIZONA.

TONTON BASIN.—*Cor. Prescott Courier*, May 12: It is reported that Mr. Chas. Bacon and others have made a rich strike of free milling gold near the old Jones quartz mill, on the east fork of the Verde. Parties who have seen the ore pronounce it the finest struck in the basin. It is also rumored that the "Golden Wonder" has changed hands and that a party of capitalists have taken hold of that property who will work it for all that it is worth.

GROOM CREEK.—*The Azlan mill*, on Groom creek, after many interruptions caused by breaking of machinery, is now steadily at work day and night on ore from the Kelley mine. Excavations are being made for placing in position two Triumph concentrators, in addition to the Frue Vanner now in use, the percentage of sulphurets in the ore being so high that a single machine is found insufficient to handle them. A new road has been made from the mine to the mill, along the creek bank, and, as it is all down grade to the mill, large loads of ore are easily hauled. The capacity of the mill is about from 12 to 15 tons per 24 hours, crushed through a 30-mesh screen. No ore has yet been stopped from the mine that is now being milled, some 250 tons having been taken out in doing dead work. Rupert & Sons are running steam arastras on gold ore from a mine situated just above the Arizona Queen Company's mill. The ore is of a very high grade. The lessees of the Nevada mine have cut a face for their new tunnel. We yesterday saw some very fine rock from this ledge, showing fine gold in great abundance.

MONTANA.

NEW MILL.—*Cor. Inter-Mountain*, May 12: The district of Marysville now shows very healthy signs of coming to the front as one of the great producers of the Territory. The wonderful success of the Drum Lummon, under the present management, has been one cause, while the astonishing returns made from the once abandoned Penobscot has been another. The sale of the Empire and other mines four miles from here to an English company, and the continued output of the Glosier and other mines, go to show that the developed lodes are permanent, and frequent strikes confirm the belief that other paying mines will fall into line. Last August John Longmaid purchased the Penobscot and Snowdrift mines; also the mill (ten stamp) and engine. Without pumping one drop of water from the lower levels, in seven months Mr. L. cleaned up in the neighborhood of \$60,000, and it is firmly believed that out of that sum cleared one-half, after paying for the property \$4,000, and for the machinery \$5,500. A new vein discovered on the Snowdrift patent this spring is turning out some very rich gold quartz. The shaft is now 70 feet deep and levels are being run. The 10-stamp mill is busy crushing the output. One-half mile south of the Penobscot, Messrs. Wormer & Elge have built a 3-stamp mill the past winter, and are doing very well on \$28 quartz from the Doc Parker and Griff lodes. The Bald Butte Company, B. H. Tatem, Chumero and the Chadwick Estell owners have a 10-stamp mill, which is run about eight months in the year on quartz from their mines. There are numerous prospects in this vicinity opened out since the Penobscot was found not to be a dead issue that in time will be heard from. These mines and mills are in Deer Lodge county, about four miles from Marysville. On this side the range in Lewis and Clarke county the Mount Pleasant mines, owned by the Charles M. Cotter estate and Wm. Hickey, have been worked on lease the past winter by Messrs. Lynch and Tierney. The 10-stamp mill on this property will start up on the 10th prox. for a summer's run.

DRUMMOND.—*Cor. Butte Miner*, May 12: Twelve miles north of this point lies what is called Sunset mining district, from which we receive glowing accounts daily. Among the rich lodes that are being developed are the Hapardnee and Independent lodes. The former was sold a few days ago to a Chicago company by Messrs. Bowles & Stone, the consideration being \$25,000. This famous gold-bearing lead is being well developed. There are two tunnels, the upper and lower. The depth of these tunnels is in the side of the mountain where this mine is located. The average width of vein of the upper tunnel from mouth to face is four feet—lower tunnel six feet. The purchasers of the mine are W. A. Kowman, W. A. Sargent, of Chicago, Illinois, and Capt. J. Rogers, of Portland, Maine. The parties are well satisfied with their investment. The enterprise is under the management of the former gentleman, W. A. Kowman. According to articles of agreement the company is to have works erected under a limited time—ninety days being specified, I believe. The first shipment of machinery for the works is expected at this point daily. It is not a regular stamp mill, but a pulverizer. The capacity of the works is supposed to be equivalent to a twenty-stamp mill.

NEW AND RICH DISCOVERIES.—Last reports from Dunkelberg Creek mines, south of here, tell us that many new discoveries have been made. Among the distinguished gentlemen that have just arrived from the new fields are Vice-President Oakes, General Manager Buckley, of the Northern Pacific Railroad, F. W. Gilbert, Division Superintendent, and J. B. McMahon, Master Mechanic of the Rocky Mountain Division, and Jop. Tibbetts, a prominent business man of Portland, Oregon. I learn from Mr. Tibbetts that the above-named gentlemen bought a half interest in a group of mines belonging to one Frank Taibass for the sum of \$300. Very little development has been made on the mines, yet among the group is one called the Little Joe, from which some ore was taken which assays as high as 300 ounces in silver and 70 in gold. One hundred and six locations have been made in the last ten days on the creek. Look out for a lively town there before fall. Joseph P. Losse and William Burt, of Pioneer, sold to A. Lambert, a heavy stockholder in the famous Granite mine, a lead on Gold creek for the sum of \$2500. A force of men will be put to work at once.

THE MOULTON.—The Moulton is producing its usual quantity of 50 ounce ore, and during the coming week will start up the Sturtevant mill, which will increase the crushing capacity of the mill to 70 tons per day. The Silver Safe and the Gulch Con. mines, which are being worked in connection with the Moulton are showing up fine bodies of ore at present. Development is the order of the day.

THE MAJOR BUDO TUNNEL.—This tunnel is located about one and one-half miles from Butte, in Park canyon. At a depth of 980 feet a fine body of ore was discovered, lying northeast. The tunnel strikes the vein diagonally. Men are now driving drifts on the vein. The company have in contemplation the erection of a 30-stamp mill upon the property during the coming season.

NEW MEXICO.

LIXIVIATION.—*Black Range*, May 7: C. J. Goff, manager of the Black Range Lixiviation Works, E. H. Russell, inventor of the Russell lixiviating process, and Mr. Wilford, arrived last night, and are making arrangements for the early erection of the new mill. The company heretofore known as the Black Range Milling Company has dissolved and the company putting in the new mill is the Black Range Lixiviation Works, with H. N. Castle, president; E. Wilder, vice-president, and C. J. Goff, general manager. The new works will occupy the same ground as the old mill. The company will put in the best possible machinery required by the lixiviation process obtainable, and will use every effort to make the enterprise a success, which they without doubt will accomplish. Mr. Goff is deserving of much credit for the push and energy he has shown in pushing this enterprise to the front that promises to be of untold value to the Apache and other mining districts in this end of Sierra county, and the mine-owners, to show their appreciation of his toil, should work their properties at once, and take out ore for the mill.

OREGON.

PINE VALLEY MINES.—*Cor. Oregonian*, May 15: Several hundred people have wintered here and have evidently been not altogether idle. Allentown now contains 76 buildings, Cornucopia 46, and there are 18 cabins straggling along the road between the two towns, which are less than half a mile apart, and which will undoubtedly grow together before autumn. Saloons, restaurants and general merchandise stores have trebled in number since last autumn; a brewery is in full operation, a two-stamp sampling mill is in process of erection, and a small sawmill has been built half a mile below town. The mines, or rather the prospects, discovered last year are still buried under the snow, and nothing can be done in the way of exploration or development for six weeks yet. During the winter a few men have been at work on the Contact, or as it is more generally known, the "Silver mine," located on the north and east side of Pine creek about four miles from here, and work has been steadily pushed upon the "Whitman" by the Louisville (Ky.) company, which purchased that mine last fall. Supplies for the Contact were carried up during the winter by packers traveling on snowshoes, but a fairly good road has been constructed to the Whitman. There has been some little work done on a few other claims, but generally it may be said that the Pine creek miners have been hibernating since November last and waiting for the coming season. Doubtless the future of the camp will be determined by the developments made this summer. The showing in the Contact at a depth of 135 feet is said to be that of a true fissure vein of five feet of quartz, with a hanging wall of granite and a foot wall of slate, exhibiting ore averaging over \$100 in silver per ton all the way down. This showing, though extremely satisfactory to the owners of the Contact, is yet of no great consequence to the camp generally, as the Contact is four miles away, in a different formation, shows a different class of ores, and evidently belongs to a different system from that of which Cornucopia and Allentown are the center. Nor can the work done on the Whitman be said to establish the permanency and value of the mines in this district. At 100 feet the drifts in this mine are said to show a four-foot ledge, with 30 inches of good ore, some of which is exceedingly rich, but it will take something more than this to make a "Bodie." The Union, Companion, Red Jacket, Robert Emmet, Red Boy, Mountain Chief, Cox and Allen, Forest Queen, O. R. & N. and other mines which produced from their croppings last summer the rich rock which first turned public attention to the Pine valley mines, are as yet practically undeveloped, and most of them remain in the hands of their original locators. These locators were, in most instances, unacquainted with the modern methods of selling mines; they placed a very high estimate on the value of their prospects, and they did not seem to be aware of the fact that the days when capitalists paid large sums for "the substance of things hoped for, and the evidence of things unseen" have passed by, and that he who expends to induce capital to sink a shaft on a quartz ledge in a new district must give up a large share of the location for the work. Probably the coming season will witness many changes in this respect, and claim-owners will either sell at low figures or else go to work on their claims, and with drill and dynamite put them in a state of development where they can legitimately ask high figures. Again, last year, the snow was an unknown quantity, both as to its depth and as to the time of its advent. Now, however, it is known that the ground will be bare from June to November, and that during the entire winter there will be practically no difficulty in working claims where work shall be fairly under way before the first snowfall. There is a possibility of a great mining city here, with a population of 20,000 people, and a bullion output of \$10,000,000 per annum, and there is a reasonable certainty of a prosperous mining camp of a few hundred people with a bullion yield of several hundred thousand dollars per annum.

STRUCK AT LAST.—*Bedrock Democrat*, May 12: Mr. Geo. Cooper, who has put in the major portion of the past two years in running a tunnel to intersect the vein of the Virtue ledge, was in the city yesterday, and informs us that at a distance of 450 feet he struck the coveted prize. The vein at present is fifteen inches in width and exceedingly rich. Mr. Cooper intends to push work on the ledge and get out all the ore possible, the working of which will be done by the Virtue mill, only about one mile distant.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official record of U. S. Patents in Dewey & Co.'s Patent Office Library, 262 Market St., S. F.

FOR WEEK ENDING MAY 11, 1886.

341,539.—DREDGER—H. B. Angell, S. F.
341,725.—CASH AND PARCEL CARRIER—P. Boland, S. F.
341,446.—PAPER CUTTER AND STAMPER—A. Brown, Mendocino, Cal.
341,365.—ELECTRIC GAS LIGHTER—Julius Finck, S. F.
341,566.—AUTOMATIC ELECTRIC GAS LIGHTER—Julius Finck, S. F.
341,572.—TAILORS' OUTLINE MEASURING DEVICE—J. S. Hand, S. F.
341,844.—WEEDING IMPLEMENT—L. C. Hill, Myrtle Creek, Oregon.
341,849.—GATE.—J. Hughesdon, Carlin, Nevada.
341,484.—IRONING MACHINE—J. F. Jacques, S. F.
341,813.—DRILL MACHINE—J. C. Muirhead, Grub Gulch, Cal.
341,691.—STEAM ENGINE VALVE—John Richards, S. F.
341,863.—AMALGAMATOR—J. W. Van Brocklin, Seattle, W. T.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Mining Share Market.

There has been no very great amount of animation in the stock market, though a fair business has been transacted at somewhat lower prices than last week. Hale and Norcross is fast approaching the Savage south line on the 2900 level, and the Savage Company itself has put a force of men to work on the 600 level of the Gould and Curry, running south into the Savage mine. This is a really important move, as the drift commences in low-grade ore, and must, it is thought, pass through something much better before reaching the main Savage shaft. No further progress has been made in draining the water in the Osbiston shaft since last week's report, but the tank and station at the 2232 level being about completed, the reduction of the water below that point will be resumed on Monday next. The low-grade ore bonanzas of both the south and north ends of the great lode continue their regular daily output, keeping several hundred men and numerous mills at work; but there is no new feature of interest to record at any point, either in low-grade ore, low-grade explorations, or high-grade hopes.

Bullion Shipments.

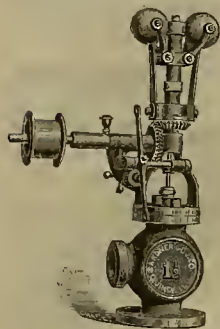
We quote shipments since our last, and shall be pleased to receive further reports:

Argus, May 15, \$21,247; Mt. Diablo, 15, \$9987; Alice, 13, \$22,496; Oro Grande mill, 16, \$2350; Hollberg & Thede, 16, \$2450; Hanauer, 11, \$8950; Alice, 11, \$14,263; Hanauer, 13, \$5550; Germania, 13, \$2331; Hanauer, 14, \$7150; Germania, 14, \$2223; Nevada, 16, \$1810; Hanauer, 16, \$2250; Overland, 16, \$1580; Germania, 16, \$6696; Alice, 17, \$11,523. For week ending May 12th, Wells, Fargo & Co., of Salt Lake, received in bullion \$56,130; McCormack & Co., \$68,526; T. R. Jones & Co., \$38,419; Union National Bank, \$27,400; a total of \$190,476.

New York Metal Market.

Telegraphic advices dated May 20th, give the following New York prices:

BORAX—6½¢ @ 7½¢.
BAR SILVER—\$98 per oz.
COPPER—LAKE—\$11.37½.
IRON—No. 1, \$17@18.50; No. 2, \$16@16.50.
LEAD—\$4.85@4.95.
QUICKSILVER—43¢@43½¢ @ lb.
The following is the latest from the "New York Metal Market Report":
COPPER—Quiet; Lake offered at 11.00c. Transferable Notices (Lake) offered at 11.20c. Transferable Notices (Chili Bars) offered at 11.40 15c.
LEAD—Steady at 4.65@4.80c. Transferable Notices (Domestic) issued at 4.85.
SPELTER—Steady at 4.45@4.65c. Transferable Notices (Domestic) issued at 4.60c.
TIN—More active at 20.80@20.85c. Transferable Notices issued at 20.75c.
TIN PLATE—Dull. Transferable Notices issued at 24.35.
IRON CERTIFICATES—Nominally \$18½ asked. Transferable notices (May delivery) issued at \$17.
SILVER—New York, 98 per oz. London, 45d.
MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18@19.50; No. 2, \$16.50@17.50; Grey Forge, \$15.50@17.00. Hudson River, Grade No. 1, \$18@19; No. 2, \$16.50@17.50; Grey Forge \$15.50@16.50. Southern, Grade No. 1, \$18.50@—; No. 2, \$17@17.50; Grey Forge \$16@17.
Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, May 7th, \$20.90@21.10; Billiton Tin, \$21.00@21.25; Banca Tin, \$21.20@21.35; Baltimore Copper, \$9.90@10.15; Orford Copper, \$9.90@10.15; P. S. C. Copper, \$9.90@10.15; Foreign Lead, \$4.70@4.90; Foreign Spelter, 4¼@4½.



Gardner Spring Governor.

TATUM & BOWEN,

25 to 31 MAIN STREET, SAN FRANCISCO, CAL.

91 to 93 FRONT STREET, PORTLAND, OR.

SOLE AGENTS FOR

GARDNER GOVERNOR COMPANY,

J. S. Mundy's Patent Friction Hoisting Engines.

The Mundy Patent has been sustained in the United States District Court of New York against the Ledgerwood Manufacturing Company, and also in the District Court in the State of New Jersey against Kendall & Roberts for infringement. Therefore all parties are cautioned against making, using, or selling Friction Drums that infringe this patent.



Gardner Governor.

GORDON & MAXWELL COMPY MINING PUMPS.

THE MOST EXTENSIVE PUMPING MACHINE WORKS IN THE UNITED STATES.

MORRIS COUNTY MACHINE and IRON CO. New High-Speed AIR COMPRESSOR.

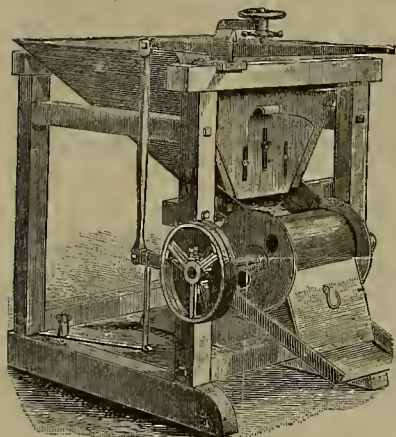
We have recently furnished the contractors the machinery for La Trinidad (300 tons per day) and Silver Queen (100 tons per day). These mines are located in Mexico and belong to La Trinidad Company, of London. The Process is the Wet Concentration, and the Plants are, without doubt, the most substantial and complete of the kind ever built.

WE MANUFACTURE ENGINES, BOILERS, AND SAW-MILL MACHINERY, and Carry in Stock:

Wood and Iron Working Machinery, Best Belting, Lubricants for Cylinders and General Machinery, Including the Celebrated ALBANY LUBRICATING COMPOUND.

THE ORIGINAL Roller Ore Feeder.

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This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

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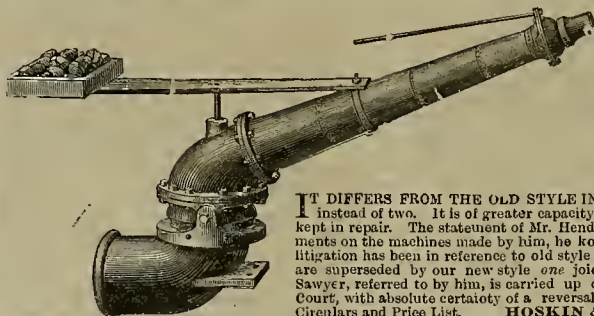
INSURE

—IN THE—



—THE—

LARGEST PACIFIC COAST COMPANY.

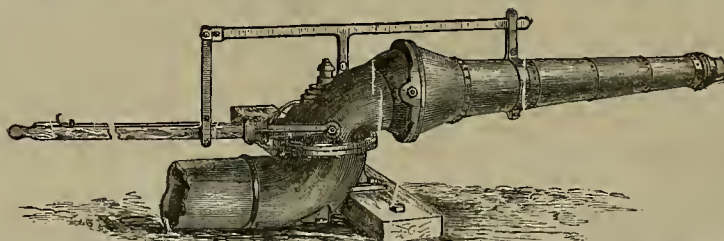


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IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List. HOSKIN & CO., Marysville, Cal.

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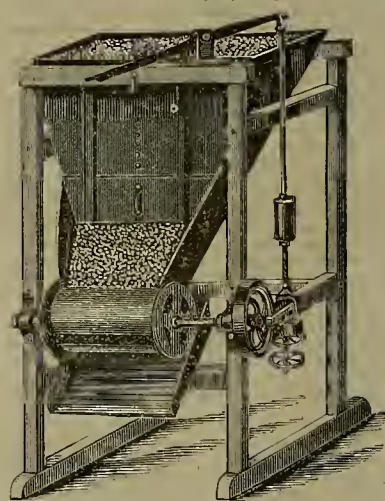
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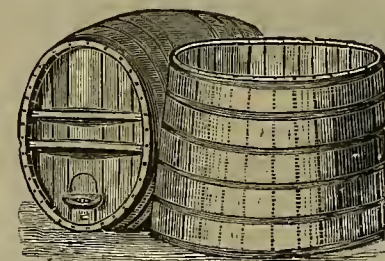
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Does not interfere with work or business. We guarantee a perfect cure in all cases which we accept and treat. Both of adults and children. Now, reader, if you are afflicted with this terrible disease, this is worthy of your investigation. We especially desire all extreme cases, those difficult to retain and those considered incurable. If other treatment has failed you, come and see us. EVIDENCE IS UNLIMITED!

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Assaying and Analysis of Ores, Minerals and Waters.
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Practical Instruction given Treating Ores by improved processes.

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Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

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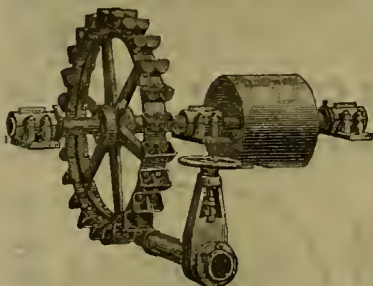
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PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

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Desires to send free full illustration and price list of their latest improved patents of Smelting and Mining Machinery adapted for the economical treatment of all low-grade ores in Europe and the U. S. of A. The Canada patent rights for sale on shares, royalty or otherwise. Address as above.



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New York Belting and Packing Company's

Rubber Goods.

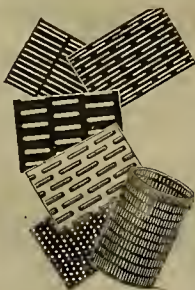
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Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 ft. high.
Orders Promptly Executed

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS. ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.		
Belmont M Co.	Nevada.	4.	10.	Apr 30.	June 5.	J. W. Pew.	310 Pine St.	
Baker Divide M Co.	California.	11.	25.	May 3.	June 7.	D. M. Kent.	330 Pine St.	
Com Amador M Co.	California.	12.	25.	Apr 30.	June 16.	F. B. Latham.	327 Pine St.	
Champion M Co.	California.	21.	100.	Apr 13.	May 20.	T. Weizel.	522 Montgomery St.	
Eureka Con M Co.	Nevada.	9.	1.00.	Apr 30.	May 31.	June 2.	E. H. Willson.	328 Montgomery St.
Grand Prize M Co.	Nevada.	18.	40.	Apr 9.	May 17.	June 3.	J. R. Grayson.	327 Pine St.
Gold Point Con M Co.	California.	9.	01.	Mar 20.	Apr 24.	May 15.	B. Brady.	Grass Valley
Gould & Curry M Co.	Nevada.	22.	02.	Mar 27.	Apr 20.	May 25.	A. K. Darbrow.	309 Montgomery St.
Hale & Norcross M Co.	Nevada.	90.	50.	May 12.	June 14.	July 7.	J. F. Lightner.	309 Montgomery St.
Justice M Co.	Nevada.	44.	10.	May 12.	June 16.	July 6.	R. E. Kelly.	419 California St.
Lucky Hill Con M Co.	Nevada.	3.	05.	Apr 5.	June 7.	July 1.	F. D. Black.	27 Ellis St.
Mayflower Gravel M Co.	California.	30.	25.	Apr 30.	June 6.	June 5.	J. Morizio.	323 Montgomery St.
McMillen S M Co.	Arizona.	6.	20.	Apr 9.	May 14.	June 8.	J. Morizio.	323 Montgomery St.
North Banner Con M Co.	California.	11.	14.	Apr 3.	May 6.	May 24.	J. J. Mitchell.	Grass Valley
Peerless M Co.	Arizona.	8.	50.	May 12.	June 22.	July 16.	A. Waterman.	309 Montgomery St.
Potosi M Co.	Nevada.	23.	30.	Apr 16.	May 21.	June 15.	J. O. Elliot.	309 Montgomery St.
Peer M Co.	Arizona.	5.	10.	Apr 13.	May 20.	June 16.	A. Waterman.	309 Montgomery St.
Santa Anita M & M Co.	California.	9.	02.	Mar 31.	Apr 27.	May 17.	J. M. Buntington.	309 Montgomery St.
Silver Hill M Co.	Nevada.	23.	10.	Apr 21.	May 27.	June 18.	V. F. Deau.	309 Montgomery St.
Union Con M Co.	Nevada.	33.	25.	Apr 19.	May 26.	June 22.	J. M. Buntington.	309 Montgomery St.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Crown Point M Co.	Nevada.	J. Newlands.	329 Pine St.	Annual.	June 7
Peer M Co.	Arizona.	A. Waterman.	379 Montgomery St.	Special.	May 29
Peerless M Co.	Arizona.	A. Waterman.	349 Montgomery St.	Special.	May 29

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Caledonia M Co.	Nevada.	W. L. Oliver.	323 Montgomery St.	10.	Feb 23
Con Virginia & California M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	30.	Feb 12
Derbec Blue Gravel M Co.	California.	T. Wetzel.	322 Montgomery St.	10.	Feb 8
Holmes M Co.	Nevada.	C. E. Elliott.	379 Montgomery St.	25.	Mar 20
Monie M Co.	California.	G. W. Sessions.	359 Montgomery St.	25.	Mar 10
Manhattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Feb 17
Silver King M Co.	Arizona.	J. Nash.	323 Montgomery St.	25.	Mar 20
Young America M Co.	California.	J. Nash.	323 Montgomery St.	40.	Apr 20

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Apr. 22.	WEEK ENDING May 3.	WEEK ENDING May 13.	WEEK ENDING May 20.
Alpha.	.55	.70	.65	.85
Andes.	.25	.25	.20	.35
Argenta.	.10	.15	.20	.30
Belcher.	1.01	1.14	1.10	1.10
Bellevue.	.80	1.90	.95	1.00
Best & Belcher.	.40	.45	.50	.45
Bullion.	.40	.45	.50	.45
Bonanza King.	.10	.15	.20	.15
Belle Isle.	.10	.15	.20	.15
Bodie Con.	.10	.15	.20	.15
Benton.	.10	.15	.20	.15
Bodie Tunnel.	.10	.15	.20	.15
Bulwer.	.70	.80	.90	.80
California.	1.20	2.00	1.25	1.40
Challenge.	.30	.40	.40	.45
Champion.	.70	.90	.65	.75
Chollar.	.70	.90	.65	.75
Confidence.	1.60	1.65	1.25	1.45
Con. Imperial.	1.20	2.00	1.25	1.40
Con. Virginia.	.30	.40	.40	.45
Con. Pacific.	.30	.40	.40	.45
Crown Point.	.35	.40	.40	.45
Day.	.10	.15	.20	.15
Eureka Con.	1.10	1.25	1.10	1.10
Eureka Tunnel.	.10	.15	.20	.15
Exchequer.	.10	.15	.20	.15
Grand Prize.	.35	.45	.50	.45
Gould & Curry.	.35	.45	.50	.45
Goodshew.	.25	.30	.35	.30
Hale & Norcross.	2.25	2.70	2.00	2.15
Holmes.	2.70	3.10	2.25	2.50
Independence.	.10	.15	.20	.15
Julia.	.05	.08	.10	.05
Justice.	.05	.08	.10	.05
Martha White.	.20	.25	.30	.25
Monie.	.20	.25	.30	.25
Mexican.	.40	.50	.40	.45
Mt. Diablo.	.35	.40	.40	.45
Northern Belle.	.10	.15	.20	.15
Navajo.	.10	.15	.20	.15
North Belle Isle.	.10	.15	.20	.15
Occidental.	.10	.15	.20	.15
Ophir.	.20	.25	.30	.25
Overman.	.20	.25	.30	.25
Potosi.	.45	.60	.45	.55
Pinal Con.	.10	.15	.20	.15
Savage.	.05	.10	.10	.10
Seg. Belcher.	.35	.40	.30	.35
Sierra Nevada.	.35	.40	.30	.35
Silver Hill.	.05	.10	.10	.10
Silver King.	7.50	7.50	7.50	8.25
Scorpion.	.20	.25	.30	.25
Syndicate.	.20	.25	.30	.25
Ugna.	.20	.25	.30	.25
Union Con.	.25	.35	.15	.20
Utah.	.60	.75	.75	.70
Yellow Jacket.	.80	.75	.75	.70

Sales at San Francisco Stock Exchange.

THURSDAY A. M., May 20.	100 Goodshew.	100	40c
100 Alpha.	80c	150 Gould & Curry.	1.15
100 Andes.	.45c	100 Hale & Nor.	2.40
25 J. & Belcher.	1.10	100 Holmes.	2.45
50 Bodie Con.	1.75	150 Mexican.	.55c
100 Bullion.	1.90	100 Monie.	2.60
50 Challenge.	.45c	100 N. Belle Is.	.50c
50 Chollar.	.70c	200 Ophir.	.70c
200 Con Va & Cal.	1.50	100 Potosi.	.70c
150 Con. Pacific.	.45c	250 Savage.	1.15
170 Confidence.	3.00	100 Sierra Nevada.	.55c
100 Exchequer.	.15c	100 Utah.	.50c
		200 Yellow Jacket.	.95c

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, May 20, 1886.

ANTIMONY—Per pound.	12	@	—
Ballet's.	13	@	—
Cookson's.	13	@	—
BORAX—San Bernardino.	—	@	8
Armago's.	—	@	61
IRON—Glenbrook ton.	22	50	@
Eglington, ton.	24	00	@
American Soft, 600.	21	00	@
Oregon Pig, ton.	21	00	@
Clippier Cap, Nos. 1 & 4.	22	00	@
Clay Lane White.	22	50	@
Shots, No. 1.	22	50	@
Steel—English, lb.	15	@	—
Black Diamond, ordinary sizes.	13	@	—
Flow.	5	@	—
Machinery.	3	@	—
Sanderson Bros.	13	@	—
COPPER.			
Braziers' sizes.	17	@	—
Fire-box sheets.	20	@	—
Bolt.	17	@	—
Sheathing.	—	@	—
Ingot.	13	@	14
LEAD—Pig.	4	00	@
Bar.	7	@	—
Pipe.	8	@	—
Sheet.	8	@	—
Shot, discount 10% on 500 bag.	1	85	@
Buck, 3/4 bag.	2	05	@
Chilled, do.	2	25	@
ZINC—German.	9	@	10
Sheet, 7x3 ft. 7 to 10 lb. less the cask.	7	@	—
QUICKSILVER—By the flask.	—	@	34.00
Flasks, new.	1	@	—
Flasks, old.	1	@	—
TINPLATE—Cook.	5	15	@
Charcoal.	5	15	@

Insurance.

Anglo-Nevada Assurance Corporation,
Of San Francisco, Cal.
FIRE AND MARINE
Subscribed Capital, \$2,000,000.

OFFICE, No. 410 PINE STREET.

DIRECTORS—Louis Sloss, J. W. Mackay, J. B. Haggin, W. F. Whittier, J. Rosenfeld, E. E. Eyre, J. L. Flood, E. L. Griffith, G. L. Brander, J. Greenebaum, W. H. Dimond.

G. L. Brander, President
J. L. Flood, Vice-President
C. P. Farnfield, Secretary
Bankers—The Nevada Bank of San Francisco.

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OF IRELAND.

ATLAS ASSURANCE COMP'Y,
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SUCCESSOR TO BENNETT & DALY,

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Manufacturer of C. E. Newman's Patent Lone Star Double-Acting Force Pumps. Shoe and Leather, Printers', Paper Makers', Fine, Experimental and Complicated Machinery of every description built and repaired. Estimates furnished for building machinery of all kinds in quantities.



UNCLE Sam has found it at last! A sure remedy for Torpid Liver, Sick Headache, Habitual Constipation, Chills and Fever, and all affections of the Kidneys and Liver. This is a New Compound, and one trial will convince you that it is the Cheapest and Best Remedy in the Market for Diseases of Kidneys, Liver and Stomach. If you want a pure vegetable compound, that is positively guaranteed to contain no mercury, go to your Druggist, and get a Bottle of the Arkansas Liver and Kidney Remedy. Price, \$1.00 per Bottle.

MINING AND SCIENTIFIC PRESS

[MAY 22, 1886

LUBRICATION.

Our readers can procure of CHARLES J. WOODBURY Manufacturer of Oils, 123 California St., San Francisco, a fine Lard Engine Oil, unsurpassed by any other Oil for general use, and which will flow through any feeder at all temperatures. Also, Cylinder Oils, Refined Cylinder Tallow, Lubric Compound, Farm, Machine, and strictly pure Lard Oil. The Woodbury Oils are in use on the Central, Southern, and Northern Pacific Railways, and on nearly every Railroad and Steamship line on the coast.

T. DOYLE, Successful.

Shop No. 1—57 & 59 New Montgomery St.

Shop No. 2—116 Washington St.

Shop No. 3—Cor. 23d and Alabama Streets.



The GOODENOUGH HORSESHOE
Gaining Fast on the Slope.

I will forfeit one thousand dollars if I fail to cure toe-cracks or quarter cracks with the Goodenough Shoe and System. Shoes and Nails of the Goodenough Pattern for Sale.

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"GOLD SEAL"

RUBBER HOSE.

FOR SALE BY ALL DEALERS.



Goodyear Rubber Co.

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W. E. CHAMBERLAIN, JR.

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Ladies admitted into all departments. Day and Evening Sessions during the entire year.

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Drawings, Specifications and estimates furnished. Machinery of all kinds constructed. Engines tested. Inventions perfected. Blue Prints. 258 Market St., S. F.

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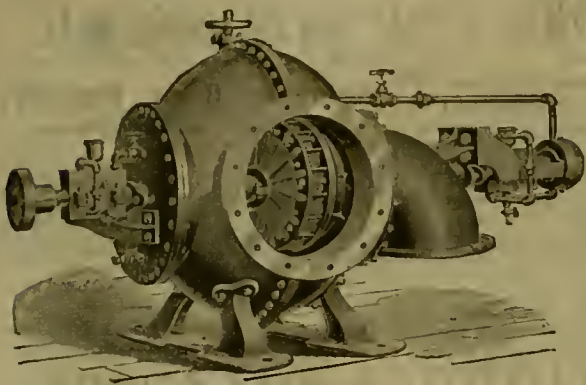
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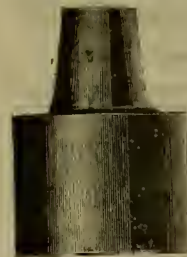
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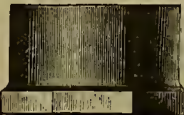
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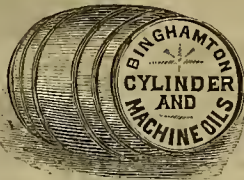
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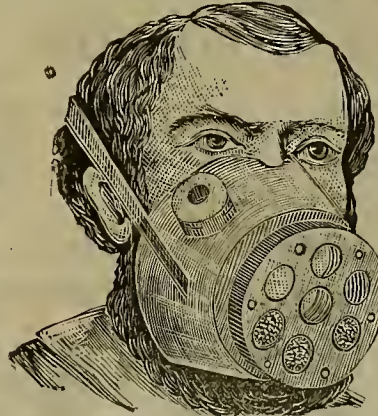
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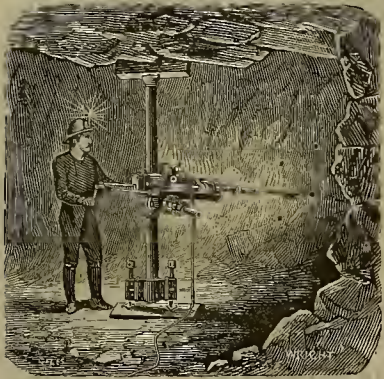
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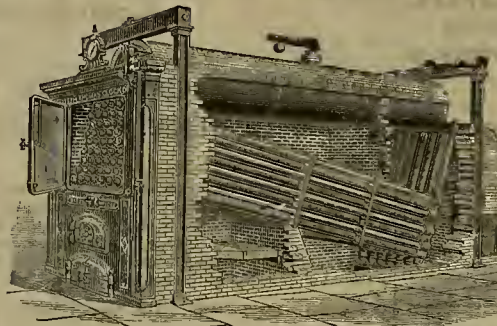
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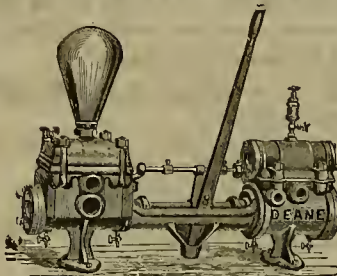
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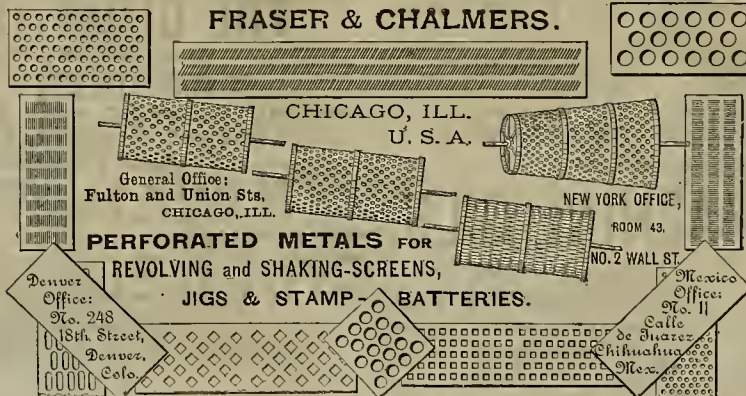
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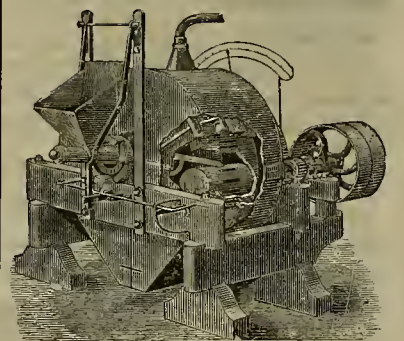
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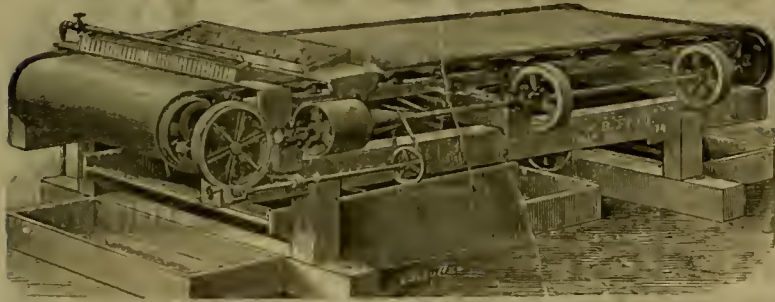
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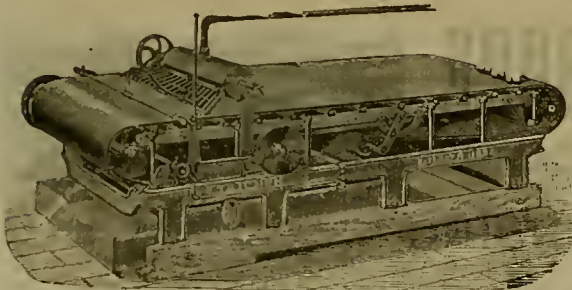
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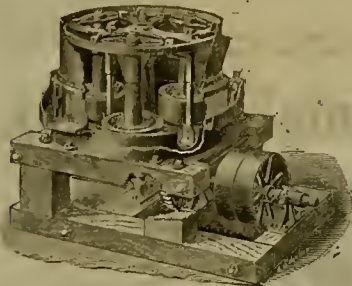
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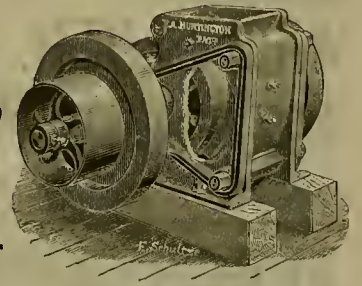
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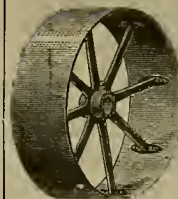
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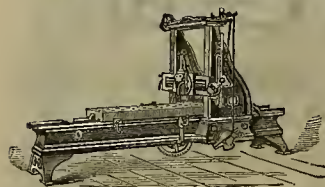
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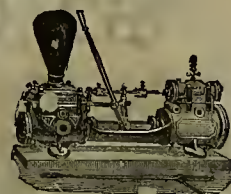
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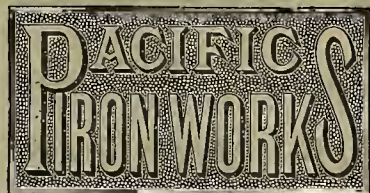
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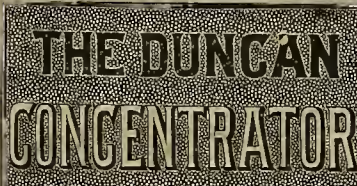
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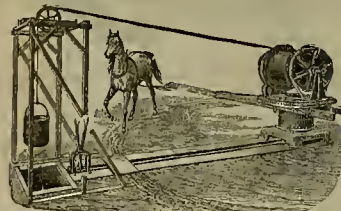
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NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, MAY 29, 1886.

VOLUME LII
Number 22

The Heating Power of Fuels.

The need of new and accurate determinations of the heating value of different coals is well recognized. The recent extensive use of liquid and gaseous fuels, "patent" fuels, tan-bark, and other refuse fuels, also makes a necessity for some correct method of determining the relative value of each of them. The first requisite in determining the heating power of a fuel is proper apparatus, such as has not been used in any of the tests of American coals yet reported. In the hope that more accurate means may be used in future tests, Wm. Kent, M. E., of New York, has called the attention of the American Institute of Mining Engineers to an apparatus which he has designed for the purpose. It is not offered as the best possible apparatus, but contains points of value and may lead to the design of still more suitable devices by others.

In criticising the tests made by Prof. Johnson in 1842, and General Meigs in 1882, Mr. Kent states that they were made by evaporating water into steam in ordinary steam boilers, and says that a steam boiler of ordinary construction is not a good apparatus for determining the heating power of a fuel, for the following reasons:

1. We can have no assurance that the fuel is completely burned. In all coals containing volatile matter, the distilled gases may be chilled by the heating surfaces of the boiler, and escape into the chimney unburned.

2. The heat generated by the fuel is carried away in four different portions: *a*, in the steam which leaves the boiler; *b*, in the "entrained" water which leaves with the steam; *c*, in the waste gases in the chimney; *d*, by radiation from the boiler and brickwork. The relative proportion of heat which disappears in each of these four different ways varies every instant, and the measurement of any one of the portions is an exceedingly difficult matter and liable to great errors.

3. The boiler and furnace having a large heat-absorbing capacity in proportion to the quantity of fuel burned during a test, it is difficult to insure that the conditions at the beginning and end of a test are the same; that is, that in addition to the four outlets for the heat of the fuel above mentioned, a fifth part of the heat has not been absorbed by the boiler and brickwork in making them hotter at the end of the test than at the beginning.

The accompanying illustration is a longitudinal view and section of the proposed apparatus. In this, *A* represents the fire-box; *B*, grate bars; *C*, tubes of upper heater; *D*, lower heater; *E*, connection between heaters; *F*, flue between heaters; *G*, chimney connection; *H*,

chimney; *J*, *K*, water-measuring tanks (closed tops); *L*, waste drain for hot water; *M*, *M*¹, admission valves to tanks; *N*, *N*¹, emptying valves; *O*, *O*¹, overflow and vent pipes; *P*, cold-water supply pipes; *Q*, hot water outlet; *R*, air-supply pipe; *S*, support of upper heater; *T*¹, *T*², thermometers for water; *T*³, *T*⁴, thermometers for air and waste gas; *U*, safety valve.

This apparatus is an attempt to avoid, to a great extent, the sources of error previously mentioned. Its principal feature is that it is not a steam boiler at all, but only a water heater. It consists of two sheet-metal cylinders, each 12 feet long, the upper one four feet in diameter and the lower one three feet, and connected by a short neck at one end only. The upper cylinder is provided with a fire-box 3 feet 6 inches in diameter and 6 feet long, and its rear end is filled with about 100 two-inch

should be calculated from the barometric pressure, and its contained moisture should also be determined. Its temperature should be taken before it enters the ash-pit. The temperature of the escaping gases should be taken by several thermometers, the bulbs of which reach to different portions of the chimney connection. Cold water is supplied to the bottom of the lower heater, at the chimney end, its temperature being taken before it enters, by a thermometer inserted in the pipe. The water supply-pipe may conveniently be attached to the city main. The water passes through the two heaters in an opposite direction to that of the gases of combustion, and escapes at the outlet-pipe at the top of the upper heater by which it is taken to two measuring tanks, which are alternately filled and emptied. The temperature of the outflowing water is taken by a thermometer inserted in the outflow-pipe. The rate of flow of water

plied to the fire. This increase, however, being in any case very slight, and the quantity of air being known, the amount of heat from the fuel which escapes up the chimney can be calculated with but small chances of error.

Arizona and the Indians.

Arizona Territory has been unfortunate in having within her borders the fiercest Indian tribe in the United States. The Apaches have maintained warfare against the whites a great deal longer than was thought possible. When temporarily subdued and brought to the reservation they only waited long enough to make ready for other raids, and wandering hands of them have roamed about the less settled regions of the Territory leaving death and destruction in their path. For many months past a small band of these implacable Indians have defied all

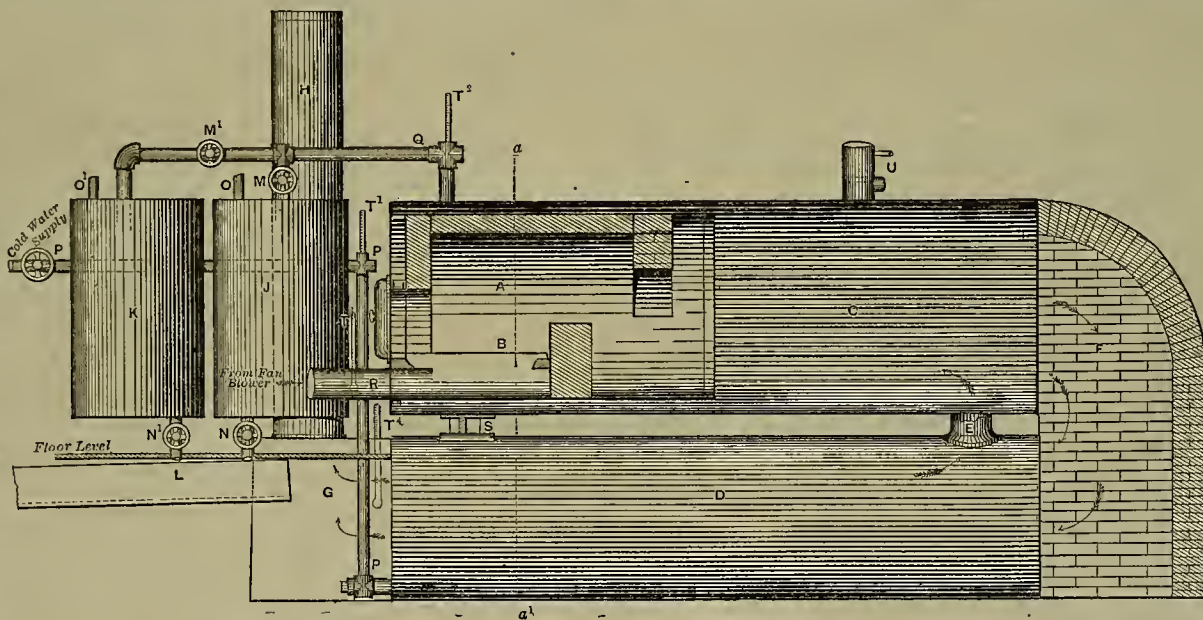
attempts to subjugate them. The rugged character of the country has been in their favor. Moreover, they are able to travel long distances on foot, where troops could not follow on horseback. The United States troops have been at a disadvantage in many ways, and, at all events, have accomplished very little of practical value in settling the Indian difficulty.

General Miles, who has recently assumed command in Arizona, is evidently in earnest in his endeavors to conquer Geronimo and his band. In addition to his troops he has enlisted the services of companies

of Mexican and white citizens. The citizens offer a reward of \$50 each for the Indians or their heads, and \$2000 for Geronimo or his head. Great enthusiasm prevails among the people, who are more hopeful than ever before of a speedy termination of the war.

While the people in the principal towns of the Territory have been perfectly safe, the rapid movements of these predatory bands of Apaches has hindered the settlement of the Territory. Those in small places or isolated camps have been in more or less danger. Prospectors and miners have been prevented from pursuing their avocation in many places. Moreover, capital has hesitated to come to the Territory to develop mines. The presence of the Indians has been very detrimental to its mining interests. Even in those places where there was no danger from Indians it has been difficult to get "outsiders" to come, for they think the Apaches are in every nook and corner. The mining interests of the Territory will never be properly developed until the Indian question is settled forever.

SAN BERNARDINO is now a city, the official document having been signed May 20th.



APPARATUS FOR DETERMINING THE HEATING POWER OF DIFFERENT FUELS

tubes. The lower cylinder is completely filled with two-inch tubes. The fire-box is lined throughout with fire-brick, and contains a grate surface two feet wide by two and a half feet long. A hanging hridge-wall of fire-brick is placed in the upper part of the fire-box, in the rear of the bridge-wall proper, for the double purpose of presenting a hot fire-brick surface to the flame before allowing it to touch the heating surfaces of the tubes and tube sheet, and of changing its direction so as to cause the gases to thoroughly commingle, and thus to insure complete combustion. In testing highly bituminous coals, it might be advisable to have more than one of these hanging walls, and to give the fire-box a greater length, to more certainly insure complete combustion of the gases. The gases of combustion pass through the tubes of the upper heater, then down through a fire-brick connection into the tubes in the lower heater, after leaving which they pass into the chimney.

Air is fed to the fire, under the grate-bars, through a pipe leading from a fan-blower. The air is measured by recording the revolutions of the blower, and the measurement is checked by an anemometer in the air-pipe. Its weight

through the apparatus is regulated, so that the temperature of the outflowing water does not exceed 200° F. The measuring-tanks have closed tops which prevent evaporation, small outlet-pipes being attached to the top of each which serve both as indicators when the tanks are full, and to allow air to escape from the tank when it is being filled with water.

The grate-surface being only five square feet and the heating surface about 1000 square feet, a ratio of 200 to one, or more than five times the usual proportion in a steam boiler, and the water being much colder than that in a steam boiler, the gases of combustion should be cooled down to near the temperature of the air supplied to the fire, especially when, as is usually the case, the water supply is colder than the air. For extremely accurate tests, the water might be cooled before entering by a refrigerating apparatus or by ice.

The whole apparatus being thoroughly protected, by felting, from radiation, the heat generated by the fuel is all measured in the increase of heat given to the water which flows through the apparatus, and in the increase of temperature of the gases of combustion as taken in the chimney, over the temperature of the air sup-

CORRESPONDENCE.

Correspondents are alone responsible for their opinions.

Mining—Its Nobility.

EDITORS PRESS:—Modern civilization is under obligation to the miner. Without the metals there can be no real enlightenment, and the finer the metals the higher the civilization. Take away the metals and man would soon return to barbarism, exactly as he was during the stone age. He cannot advance; he cannot be scientifically refined without using the metals. There is no alternative, no substitute; he must have the iron and steel, silver and gold.

A steam engine won't work made out of glass, nor would a sewing machine be any good made out of rock or wood. The metals make civilization possible. Just think for a moment what man could do if he had no metal for his machine, his engine, his telegraph, telephone, electric light, etc. Why, he couldn't have them, of course. Strike from our possession all metals, and render it impossible to obtain more, and you would soon behold the present race sink to the level of the savage. Man, then, would have no railroad, no ocean steamer—not even a stove to warm him in winter, while he would be compelled to do his plowing with a forked stick and live in a hut or a dugout. I am thankful that nature has furnished the metals so we can find them and use them, and make life worth living.

I hold that the mining industry is a noble and glorious work—that the miner is a benefactor, that his products are permanent and a lasting gift in aiding and helping the whole world. His gold and silver is the vital "life blood" of commerce—it facilitates international intercourse. Every bright dollar represents so much labor—it is, in one sense "omnipotence" limited. That is why so many are after the almighty dollar. Why, I have never met even "a true Christian" who obeys Christ's command—"Sell all thou hast and give to the poor."

It seems they would rather not sell—they like the gold on earth and expect even golden streets in "heaven." Strange, is it not? Let that be as it may; I would prefer that, what little gold there is in this globe be arranged nearer the surface. We are willing to take chances on decent "outcrops" and it makes no difference to us on this globe whether the streets in "heaven" are gold or lead. I would rather have a million in gold here in this world than to walk over golden streets in heaven. The facts are, I don't want to be an angel. But enough—"one world at a time" is what I believe in.

Does mining pay? I rather think if it did not pay there would not be many men engaged in the business; it pays, and it pays big. There has been billions made at mining.

For instance, during the year 1882 the value of the metallic products of the United States alone was more than \$219,756,000 of which \$79,300,000 was in gold and silver. (Fourth Annual Report United States Geological Survey.)

Without full statistics regarding the amount of capital invested and the number of men connected with mining, it would be difficult to give definite figures in regard to the profits of the business. It is known, however, that the profits are very liberal, taken as an average. Of course, it is like any other industry in this respect, and that is, it requires competent men in order to make it a success. Great progress has been made during the last decade. Mining to-day is a science, and modern miners are men of science. They don't "go it blind"—they read the rocks, they unlock the hidden treasures with the veritable key of geology. Before a pick or drill is brought to use on the ground the miner sees what he has on the surface; if the evidence is not complete he doesn't touch it. He takes as few risks as possible. He knows certain indications and his constant experience brings to light new facts. "Facts" are his delight. He is a practical man, and practice makes perfect. Mining, he it remembered, is no child's play; it takes the most proficient workmen to open and develop a great mine. "Skill" or practical ability is the miner's reliance; his confidence is based wholly on facts. Without such dependence, there can be no science.

Modern mining means successful mining. There is no excuse for failure. Ignorance is the cause of the latter. Millions of dollars have been wasted by ignorant men. Why, I know of men who spent months cutting tunnels and sinking shafts through "mountains of granite" looking for coal. They didn't find coal in that rock. It is a geological impossibility for coal beds to exist in archaic or azoic granite. Those "miners," if such they can be called, didn't know the rudiments of geology, hence the failure. There can be no science in mining without a knowledge of geology. The successful miner of the present day is also a practical geologist. Without such knowledge he can be no more than a pretender, as much so as the leaders of the Mormon church. Mining, again, is a perfectly legitimate industry; nobody is robbed; the metal is taken direct from

nature. It is time that this clamor about mining being illegitimate were hissed down.

None but the impostors, dupes and ignoramus hold to such an absurd conception. There are no facts to sustain even the idea of such a thing. The cry may be always traced to those who have been swindled and cheated by the impostors who handle "wildcats." Mining is pre-eminently a legitimate work—perfectly consistent with morality, and, in itself, is a moral work. I challenge any person to show otherwise, and last, but not least, the production of the metals means also scientific progress. "The finer the metal the higher the civilization;" the more steel, silver and gold the better for the whole race, unless barbarism be preferable to enlightenment. I like mining and I like every honest miner. This industry is full of promise throughout the occident, and the western miner has a bright future; there is a ready market somewhere in the world for all the metal he can put on top of the ground. So let us pick and drill and break treasures from the old globe's crust, and let the "illegitimate fiends" grumble and growl until they are sick. All progressive men have faith in mining; they see the need of it. The time approaches when this industry will become ten times its present importance. Mining must continue and the demands of humanity will cause the work to increase rapidly in order to supply the needed metals.

CHAS. F. BLACKBURN.

Kaysville, Utah.

Hints For Lubricating.

EDITORS PRESS:—"The time will come when it will be considered a degrading adulteration to mix animal oils with pure petroleum refined lubricants." So said an experienced and distinguished oil manufacturer of Boston, ten years ago. The assertion was based upon the clumsy mechanical mixtures at that time but too common. Since then, products have been reached by the redistillation and super-steam heating of petroleum oils which would startle the conceptions of the Boston veteran, and his prophecy is daily being realized in those great manufacturing centers where closeness of competition has made the most economical choice and use of lubricants a point of necessity.

In the West, however, where all things are done on a more liberal, even if smaller scale, there remains obstinately an adherence to the more costly animal and vegetable oils and the cheaper fish oils, simply because they are traditional.

Imagine the cost to railroads, for example, if, with the immense extensions to which they have grown during the last score of years, they were still compelled to depend for their lubrication on lard-oil.

The writer well remembers his first interview with the master-mechanic of a prominent Eastern railroad twenty years ago. The occasion was the offering of a pure, heavy, natural Ohio oil for the lubrication of the locomotives.

"But it is black!" exclaimed the officer. When a few drops poured on the slides, and then removed with waste, left them bright and shining as before, he no longer considered color an objection, and after a long interview he reluctantly tried ten gallons! In a fortnight he ordered ten barrels; and in two months the oil was in constant use over the entire line. Now, oil of this character has been recognized as standard by all the great trunk lines of the country. Whale-oil, the old R. R. standby, is no longer heard of in the shops or on the road.

Mining and millmen and managers of factories appreciate pure and chemically-blended mineral oils because of their perfect freedom from gum. In all machinery where the multitude of spindles makes the labor of cleaning intolerable and expensive, these oils are deservedly popular. Yet, now and then, the oil-pilgrim encounters engineers and superintendents who will not believe that an oil is good for anything unless they have to spend half an hour after steam is shut off at night removing the coagulated gum from exposed surfaces of friction.

CHARLES J. WOODBURY.

Comparative Trials of Quartz Mills.

EDITORS PRESS:—I observe that there has lately been made at the Oro Plata mine, near Murphy's, in Calaveras county, a competitive trial of a 15-stamp mill and four Tustin barrel-mills, and that the latter gave somewhat better results.

At the usual rate of duty of a stamp-mill, that is, one and one-half tons per day of hard quartz to the stamp, this gives for the 15 stamp mill 22½ tons per day, and as the four Tustin mills are said to have done somewhat better work, their duty may be placed at 24 tons per day, or six tons to each mill.

I would call, for purpose of comparison, the attention of your readers to a quartz-mill lately introduced on this coast, and noticed in your issue of the 15th of this month, and which is now in operation at the Pacific Iron Works in San Francisco. I refer to the Frisbee-Lucop mill, the principle of which was demonstrated to my satisfaction, after many practical trials

on a large scale, to be correct, and the results superior to any mill as to efficiency and economy of work. The principle involves the pressure, by centrifugal force of steel rollers, driven by a driver, running at a high speed against a ring-die of chrome crucible steel.

These mills are of different sizes, and we will take the size having a diameter of 20 inches. Its weight is but 3500 pounds, complete, that often mortars alone of the stamp-mill spoken of (15 stamps and 3 mortars) will reach at least 9000 pounds, and light at that, for mortars in many mills weigh 3500 to 4000 pounds each. The 4 Tustin mills weigh as much. Compare these weights with that of the Frisbee-Lucop mill, complete (3500 pounds). Weight means cost.

We will proceed next to comparative horsepower required. The 15-stamp mill requires about 20-horse power; the 4 Tustin mills a little less power, and the 20 inch Frisbee-Lucop mill about 8-horse power.

The next, and equally or more, important point is the comparative capacity of these three radically different forms of mills, each being best of its kind. The 15-stamp mill, per day of 24 hours, will reduce 22½ tons; the 4 Tustin mills, together, about 24 tons in the same time; and the single 20-inch Frisbee-Lucop crushes at the rate of 24 tons, and this result has been obtained with them in constant operation on hard quartz and other material in the East during the past year. The operation has been under the supervision of Pacific Coast men, who, by practical experience, have become thoroughly skillful in quartz milling. I have recently received statements from these gentlemen, who are entirely reliable, showing this duty done, though it seems almost incredible that so small a machine as that, the ring-die of which is only 20 inches in diameter and face of die 3 inches, can do such great work. The wear of these mills is only 1 cent per ton crushed.

Comment on the above figures and facts is scarcely necessary to the intelligent, practical millman, and their importance to the mining interests of the Pacific Coast cannot be overestimated.

I have proposed to Mr. Gideon Frisbee, the general manager of the "Frisbee-Lucop Mill Co.," and who is now in San Francisco, to place one of these mills, preferably the largest size (24 inches in diameter), in some first-class stamp-mill for prolonged comparative trial, and should such trial be made, and I have every reason to believe it will be, record will be kept of the results for future reference and publication in the PRESS.

LOUIS BLANDING.

Sonora, Tuolumne Co.

Quartz-Crushing Machines.

A Hint to the State University.

Which crushing machine shall I buy? This question every man who is about to erect quartz machinery, and wishes to do the best for himself or his company, is forced to ask himself. So far the answer is, nine times out of ten, in favor of stamps; but it does seem strange that in such a brilliant age as ours no improvement can be made on the primitive stamp. The efforts of inventors have produced a large number of grinders and crushers involving all sorts of mechanical movements, about which the public know absolutely nothing, and no one now feels able or willing to go to the expense of giving any of these machines a trial. We counted in the advertising columns of an Eastern paper no less than 12 machines for grinding quartz "or other hard substances to a powder," and each of these machines is fully warranted to do just what is advertised. Now, none of these machines are anything like as expensive as a battery, and all may be had of any desired capacity. Cost is the problem that stares the owner of a quartz mine in the face when he begins to think of a mill, and the cold chills run down his back as he gazes on the figures resulting from his investigations.

Now, we beg leave to ask our State University solons if it is not possible, amid all the experiments they are continually carrying on in the interest of the honest Granger, they can do a little for the honest miner? We think it would be a grand idea for the School of Mines connected with the University to undertake to test the various machines now offered for the grinding of quartz, in order to furnish the miner with accurate information as to their value. We have no doubt that the inventors of these new appliances would gladly furnish the machines and every facility in their power for making the experiments, for whoever came out victorious would have scored a big point. The test should also include the fitness of the ores for amalgamation after grinding, for in the various means used to accomplish this, the ore may be made better or worse for saving the gold contained therein.—*Sierra Tribune*.

MEDAL AWARDED.—The Board of Judges appointed by the Franklin Institute, after an exhaustive examination of the state of the art, have recommended the "Grand medal of honor" in favor of Thaddeus S. C. Low of Norristown, Penn., for his substantial improvement in the manufacture of water gas, and for his numerous improvements in methods and appliances for utilization of water gas as a fuel for domestic and industrial purposes, and as an illuminating agent.

MINERS are warned at Victoria, B. C., not to go to the Granite Creek mines.

Copper in Boiler Construction.

Many materials have been used at different times in the construction of steam boilers. Thus boiler shells have been made of wooden staves, of granite, of copper and of cast iron, while for the interior portions in contact with the fuel or with the heated products of combustion cast iron, copper, brass, wrought iron and mild steel have all been and still are employed. The use of copper for these interior portions, remarks the *Mechanical World*, and to some extent for the outer shells, was formerly somewhat common, and more especially for marine boilers, where salt water had to be used. But within the last quarter of a century it has been to a large extent superseded by iron or steel, so that one hardly hears nowadays of copper being used in this connection except for small domestic boilers, pot boilers used in certain trades, and for the fire-boxes and sometimes the tubes of locomotives. The reasons for this change of practice are not far to seek. Although copper does not ordinarily rust to anything like the same extent as iron, it is somewhat more rapidly damaged in the furnace by the use of sulphurous fuel such as engineers are often obliged to burn. Again, when from any cause a leak is sprung in a joint, it is not so readily taken up or calked as is the case with iron, and, furthermore, any incrustation from salt is found to deteriorate the metal in the vicinity of the leakages to a greater extent. Then, too, copper is sooner reduced in tenacity by accidental over-heating. Iron does not become perceptibly weaker up to a temperature of 570°; after that temperature is reached the strength gradually decreases, whereas copper is in its best case when cold, and loses tenacity by every increase of temperature. Stated in even numbers the strengths of the three kinds of material now most used, stand to each other about as follows:

Mild Steel.....	97,000
Good wrought iron.....	50,000
Tough copper.....	34,000
Do. at 570 deg., about.....	27,000

Add to the above disadvantages the greater first cost of copper (very much reduced within the past few years, but still considerably more than steel or iron), and it is not surprising that its use is now so much limited.

Yet with all these disadvantages it has some important advantages over both the other materials mentioned. It is far less liable to blister than is iron; it is much more to be relied upon than mild steel, which has often proved itself very treacherous; it can be made and repaired with much less labor and cost than either iron or steel. It has a much higher conductivity, and so is less liable to injury from overheating; it is not so readily incrustated by the use of foul water, and, finally, the value of the scrap copper from an old boiler is considerable as compared with its first cost, while that of a worn-out steel or iron boiler is inconceivable. It seems, therefore, that a good case may be made out for its more extended use now that the first cost is so immensely reduced, in spite of its comparatively low tensile strength and in the face of the high pressures now generally used. As bearing on this point it must not be forgotten that the fire-boxes of locomotives, which have to stand very high pressures and very intense heat, are still, except in this country, where mild steel is largely employed, almost universally made of copper, and even here there are many advocates for the use of copper.

One reason advanced for the adoption of steel in place of copper in the United States is of a somewhat special nature. The fuel used is anthracite, and this, from its hardness and the sharpness of its fractures, is found to injure copper fire-boxes mechanically. The greater hardness of the steel employed mitigates this evil. Mr. Ternie, in his paper read last year to the Institution of Civil Engineers, mentions as one reason for employing steel in place of copper in the locomotives of the Pennsylvania railroad that it better resists the intense heat developed by the blast acting on the anthracite coal. But this, adds our exchange, must surely be a mistake, as the well-known greater conductivity of copper is all in its favor in this respect. Should the many advantages (including lower price) enumerated above lead to an extended use of copper as a material for the construction of steam boilers to work at high pressures, no doubt efficient strength will be obtained, either by increasing the number of internal stays or by varying the forms, or by a combination of these methods. The difficulties in this direction are by no means insuperable, and there would appear to be room for a largely extended use of copper in this as in many other directions.

A SLOKENS SUIT.—The suit of Acter Hardt against the Liberty Hill Consolidated Mining Company is pending in the United States Circuit Court. Hardt sues to prevent the defendant from carrying on hydraulic mining, and on his motion Judge Sawyer granted a temporary injunction, preventing the defendant from mining until the suit is decided. A motion of the defendant to modify the temporary injunction was denied by Judge Sawyer.

The second oil well at Puente is a success at a depth of 300 feet. A fine body of oil is produced, of rather heavy quality, but excellent for fuel purposes.

Honduras Mines.

More or less attention has of late been directed to Honduras by reason of reports announcing the discovery of rich gold fields. Honduras is a State of Central America, extending east and west from the Caribbean sea to the Pacific ocean, and separating Nicaragua on the south-east from Guatemala on the northeast. It stretches in north latitude between 13° 10' and 16°, and in west longitude between 83° and 89° 45', containing about 47,000 square miles. The country is generally mountainous, being traversed by the Cordilleras, which connect the Andes on the south and the Sierra Madre on the north. The minerals known to be found there are, gold, silver, copper, iron, cinabar, zinc, antimony, iron, platinum, asbestos and coal. Mining was formerly the chief business of this country, but has been more or less abandoned. The difficulties of transportation are great. There are very few working mines, and the native laborers only get 50 cents per day. Rich places to work by hand are scarce, and although there are large tracts of mineral land, the country is no place for a poor man. The account of the placer deposits on the Guayape river are now said to have been greatly exaggerated. All accounts agree, however, that poor men have no business to go there.

A Honduras correspondent of the *Engineering and Mining Journal* writes a letter in which he warns men from coming to that country, unless they are well provided with money. He states that in two trips to Olanchito and the Guayape river, while he did not find them barren of gold, he saw nothing to cause a "rush." For two hundred years the Spaniards and natives have been washing gold in the Guayape river, which runs through the Department of Olanchito. They have washed with a "batea," doing a little sluicing, and feeling satisfied if they got twenty-five cents a day. Women are now washing there who are glad to get \$2 a month for their labor. This correspondent does not believe there is a rich place accessible where a poor man could make wages washing, and sincerely trusts that no man, who is not abundantly able to buy a mule or two and keep himself for six months, should come to Honduras. The following paragraphs from the letter referred to give just the information miners want:

A man coming here via Puerto Cortes, which is the nearest port to the gold fields, must travel eight days by mule till he reaches Olanchito, and when he gets there he will not find gold all ready to wash out in a pan, a cradle, or even a sluice. The natives are not savage, and many of them can beat the best American miner in panning and in the use of mercury, and their knowledge of ores and minerals is wonderful.

You can get no outfit in Honduras, but must buy pans, shovels, picks, steel, hammers, explosives, fuse, blankets, tents, saddles, and, in fact, everything in New Orleans. At Puerto Cortes you take the railroad to San Pedro, where mules are taken to Olanchito. Bring your United States bills with you and the merchants will give you about 33½ per cent premium.

Cargo mules are worth \$60; saddle mules, from \$100 to \$200.

In traveling over the country, it is not necessary to pack many provisions with you. There are many ranches and pueblos where corn, tortillas, beans, eggs, chickens, coffee, sugar, dried beef, etc., can be had. Flour, there is none, consequently cakes made of ground-up corn are used as bread.

New Orleans to Puerto Cortes, \$30; Puerto Cortes to San Pedro, \$3, by the railroad; by the steamboat that goes from Puerto Cortes up the Ulua river to Rio Pelo, \$4. Rio Pelo is one day's journey from San Pedro, and for men with plenty of stuff it is better to take the boat that connects with every alternate steamer at the port.

Men who intend to walk, unless they know exactly where they are going, had better stay at home. Tramping in the cool mountains of Colorado is very different from going through the coast swamps and hot tablelands of the interior. Orancho is clear from underbrush and comparatively easy to prospect. Finally, let me urge most seriously upon you the idea that none but men with a good "stake" should come to Honduras. Miners cannot compete in the few working mines with natives, at 50 cents a day. They cannot find rich places to work by hand. They will suffer privations, get the fever, and, perhaps, die.

Tunnel Projects.

The Big Bend tunnel project, recently described in the *Press*, and which lays bare some 14 miles of the suriferous bed of the Feather river, is an enterprise of more magnitude than ordinary mining companies care to undertake. But if the scheme is successful, as hoped, similar enterprises will doubtless be carried out. This river mining experiment is being watched with great interest by miners all over the State. All the branches of the Feather river contain more or less gold, and other tunnels will be run to drain portions of the bed if the Big Bend Company makes good cleanups after the river water is turned into their tunnel. The anti-debris people can find no objection to such projects, as no material is put into the river.

Another big tunnel project for the development of quartz mining interest is also proposed, this time in Nevada county, in this State. This is the Gold tunnel mining scheme, and it is expected that work on the tunnel will be commenced in the next sixty days. The main tunnel as projected will extend from just above Hoyt's crossing, on the South Yuba river, to the vicinity of Town Talk, on Gold Flat, a distance of a little more than four and a half miles, following the Wyoming, Ural and Providence lodes. One branch will pass through the Gold Flat district, and another branch will tap the Idaho and neighboring claims. The total length of the main tunnel and branches will approximate eight miles.

The Nevada Transcript says of this scheme: In the region which it is proposed to penetrate by the tunnel are known to be 120 gold-bearing ledges, and from them it is estimated upward of \$100,000,000 worth of gold has been extracted during the past 35 years.

The workings have, as a rule, been superficial, a depth of more than 300 feet having been attained in but two or three places.

It is calculated that at a point 3000 feet from the mouth of the tunnel a vertical depth of 812 feet will be attained. The vertical depth at the Newtown road, near Mrs. Pooler's place, will be 1222 feet; at Gold Flat it will be 1600 feet, giving backs on the ledges of from 2800 to 3000 feet; and at the Idaho the tunnel will bottom the present workings at a vertical depth of something like 1250 feet.

The tunnel, if completed, will give perfect drainage to the entire mineral belt mentioned, and permit of the cheap working of the ledges.

Educate the Mind as well as the Hand.

Every man who is engaged in any kind of mechanical labor should cultivate studious and observant habits. There is scarcely any description of knowledge but which he will at some time have use for, especially if he ever hopes to rise above the position of ordinary mechanical labor. No man can ever hope to attain distinction as a mechanic unless he educates his mind as well as his hands.

One of the most important acquirements of a mechanic is that he should be able to readily and lucidly convey ideas to another. Many men, says a contemporary, otherwise competent to direct others have failed from lack of this faculty, or have refused good positions because they knew their weakness in this respect. Perhaps as many foremen fail from this cause as from any other. Undoubtedly, this faculty is one to be acquired; it is not one, if there are such, that is born with a man. Every man who works at a mechanical business should labor in the direction of acquiring the habit of concisely expressing his ideas, making this a part of his mechanical education. Talking of such subjects will help a man; writing of them is excellent practice.

A Good Mechanical Eye

Is also a most essential requisite in a good mechanic. No one can ever attain distinction as a mechanic unless he is able to detect ordinary imperfections at sight, so that he can see if things are out of plumb, out of level, out of square and out of proper shape, and unless he can also detect disproportioned or ill-shaped patterns. This is a great mechanical attainment, and one which can be readily attained by any ordinary person. Of course, there are defective eyes as there are other defective organs; the speech, for instance, is sometimes defective, but the eye is susceptible of the same training as any other organ. The muscles, the voice, the sense of hearing, all require training. Consider how the artist must train the organ of sight in order to detect the slightest imperfection in shade, color, proportion, shape, expression, etc. Not one blacksmith in five ever attains the art

of hammering square, yet it is very essential in his occupation. It is simply because he allows himself to get into a careless habit; a little training and care is all that is necessary for success.

The fact is, says the writer, that the eye is not half as much at fault as the heedless mind. Some carpenters acquire the careless habit of using a try-square every time they plane off a shaving, in place of giving their minds right to their business and properly training their eyes, and unless they cultivate this power of the eye they will always be at journey work. Look at the well-trained blacksmith; he goes across the shop, picks up the horse's foot, takes a squint, returns to his anvil, forges the shoe, and it exactly fits the foot. Contrast him with the bungler who looks at the foot, then forges a shoe, then fits the foot to it, often to the ruin of a fine horse. Now, this fault lies in ever allowing himself to put a shoe on that is not in proper shape for the foot; he should determine to make the shoe fit the foot in place of the foot fitting the shoe, and he should follow it up until the object is accomplished.

How to Train the Eye.

A very good way to discipline the mechanical eye is to first measure an inch with the eye, then prove it with the rule, then measure a half inch, then an eighth, and so on, and you will soon be able to discover at a glance the difference between a twelfth and a sixteenth of an inch; then go to 3 inches, 6, 12, and so on. Some call this guessing; there is no guess work about it. It is measuring with the eye and mind. Acquire the habit of criticizing for imperfections every piece of work that you see; do everything as nearly as you can without measuring (or spoiling it), or as nearly as you can trust the eye with its present training. If you cannot see things mechanically, do not blame the eye for it; it is no more to blame than the mouth is because we cannot read, or the fingers because we cannot write. A person may write a very good hand with the eyes closed, the mind, of course, directing the fingers. The eye is necessary, however, to detect imperfections. Every occupation in life requires a mechanically trained eye, and we should realize, more than we do, the great importance of properly training that organ.

Wool Manufacturing.

In cotton manufacturing there has been from the first a decided tendency to the concentration of capital at comparatively few points, and generally in few hands. The business has usually been conducted in large establishments. Cotton manufacture has been the chief factor in building up such large cities as Lowell, Fall River, etc. On the contrary, wool manufacturing has exhibited a much less inclination to centralize. The bulk of the woolen mills of New England are scattered up and down her valleys everywhere, dependent for power upon her numerous streams, and affording a convenient and remunerative market for her local product of wool. Woolen manufacture has never been an important factor in building up any large town in this country. The introduction of the power loom and small factories is simply carrying out its early form as a "household industry" on a larger scale, and on something of a co-operative plan.

The reason for this difference in the two industries is, no doubt, due to the double fact that the prosecution of the latter is less complicated, and that it had already proved remunerative, even as a household industry, a result which cannot be expected of cotton. It is for this reason that a period of depression in the woolen industry makes a comparatively less stir in the industrial world than a similar depression in cotton manufacture. A few thousand operatives thrown out of employment in such a city as Fall River creates more comment and stir than double that number discharged from employment in a dozen different localities. Small bodies of sufferers scattered through small county towns will be more readily absorbed into other industries, than a large body in a town chiefly devoted to a single industry.

For reasons which will be naturally inferred from the above, the woolen industry is the one of all textile manufactures which should be especially encouraged in California. The history of the introduction and progress of the industry thus far on the Pacific coast is similar in character with that above outlined for the Atlantic coast. Its introduction both there and here has met with a larger degree of success than almost any other which can be undertaken on a small scale and with comparatively little capital. Every large town on this coast, whether supported by mining or agriculture should have its woolen mill. It is an industry which always pays under good management.

CALL FOR CHROME IRON ORE WORKS.—The San Luis Obispo Mirror says: "Quite a quantity of chrome ore litters the yard of the railway company awaiting shipment. It is a wonder, at least to us, why some enterprising parties do not erect a refinery here for this ore. It is to be found in almost inexhaustible quantities in the county, and if it pays to ship the ore in a crude state to Baltimore, it would certainly be as profitable, if not more so, to refine the ore here."

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CASH AND PARCEL CARRIER.—Patrick Boland, S. F. No. 341,725. Dated May 11, 1886. This cash and parcel carrier is intended for service in stores. It consists of a peculiarly-arranged guard or latch, by which the supporting wheels of the device are prevented from leaving the rope or wire track. In the construction of this particular class of apparatus, two deeply-grooved rollers or pulleys are journeued upon a frame, one in front of the other, and the parcel-carrying basket is suspended from the lower part of the frame. The wire upon which the apparatus travels has one end attached at the receiving desk and the other is connected with a vertical post at the counter end, so that it may be raised or lowered to change the inclination and cause the car to run either to or from the desk or counter. At the counter end the car runs from the wire into the height of a rope or cord, which is so arranged that the car and basket may be lowered to a point within reach of the salesman. This end of the wire is supported by an arm, or trap, which is bent sufficiently to one side to allow the carriage to pass by it upon leaving the wire and on to the rope. In order to allow the car to pass the trap it is necessary to have the fixed guard or lower part of the frame, which is curved around beneath the pulleys, left open upon one side sufficiently to allow the bent arm to pass between this guard and the pulleys, and from this cause there is danger that the car will leave the wire and fall off. In order to prevent this, spring-arms or gates have been connected with the frame. Mr. Boland provides a peculiar bent arm, which overcomes the present difficulties, forming a guard, without springs, and through which it is impossible for the rope to escape.

DREDGER.—Horace B. Angell, San Francisco. No. 341,539. Dated, May 11, 1886. This dredging or excavating apparatus consists mainly of an excavating drum or cylinder with suitable driving mechanism by which it is rotated, a stationary suction tube or pipe in suitable relation with the excavating drum to receive the material and engine by which the excavator is driven, an inclined ladder hinged to one end of a float or dredge-boat, and supporting these devices, and a means for connecting this movable mechanism with the stationary boilers and pumping apparatus on the boat. For dredging or excavating, various devices are employed, among which is an endless chain of buckets moving over an inclined ladder or frame, one end of which is hinged to a boat, upon which suitable driving machinery is placed, while the other sinks to the bottom or rests upon the spot to be excavated, so that each bucket may be filled as it reaches the bottom and pass up the inclined ladder to be discharged at the top. Another form consists of a rotary digger driven by a central shaft and having a vertical telescopic tube extending upward from it to a pump, by which the excavated material is drawn up to the surface, the telescopic pipe allowing the cutter or excavator to work at different depths. In this invention, Mr. Angell has combined an excavating-drum rotating upon its own axis with an inclined supporting-frame or ladder hinged at its upper end to a dredge boat, and having a suction pipe of fixed length supported upon it and leading from the excavator to a pump and discharge. This admits of moving the excavating-cutter on a vertical arc about the trunnions of the ladder, while the side movement is obtained by swinging the dredge boat about suitable speeds or anchors.

ELECTRIC GAS-LIGHTING APPARATUS.—Julius Finck, San Francisco, assignor to Will & Finck. No. 341,565. Dated, May 11, 1886. The object of this invention is, first, to provide an apparatus in which a battery of light power can be used for generating the spark, this being rendered possible by the fact that the spark-circuit remains open normally, and is only closed at the moment of use. A further object is to provide a means for opening or cutting out both the spark and the supplementary circuit, when, by reason of any derangement in the mechanism, they remain closed; to provide an alarm to give notice of such opening and its cause, and to furnish a means by which the circuits can be returned to their original condition after the cause has been removed.

AUTOMATIC ELECTRIC GASLIGHTER.—Julius Finck, S. F., assignor to Will & Finck. No. 341,566. Dated May 11, 1886. The object of this invention is to provide electrical apparatus, by which any number of fixtures, with any number of burners, in the same or separate rooms, may be simultaneously or independently lighted.

THE YUKON MINES.—The steamer *Leo* has reached Port Townsend from Sitka. Trouble is apprehended with the Indians at Chilkat over the control of the business of package. Other Indians offering to do the work cheaper. Several new fishing stations have been started along the coast. Miners are still rushing in droves toward the Yukon country, of whose richness incredible stories are told.

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W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, May 29, 1886

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Passing Events.

The burning of the hoisting works and destruction of the fine pumping plant of the Grand Central mine, which occurred this week, is a severe blow to Tombstone, Arizona. The camp can ill afford such an accident at this time.

The starting up of the new mill at Candelaria, Nev., is a great event for Columbus district, and the miners expect a renewal of prosperity in that region.

There are rumors that one of the principal mines in Sierra county, near the Nevada county line, has been sold for a good round sum in the London market. If this proves true, the region thereabouts will be greatly benefited, as the mines near by will have an increased valuation.

There is some excitement in the neighborhood of Susanville in the Honey Lake country, Nevada, over the new gold workings south of that town; both placer and quartz mining is being prosecuted with encouraging success.

All the furniture manufactories in St. Louis are closed, owing to the attempt of the proprietors to return to the 10-hour system.

Gold Quartz Mines.

The gold quartz mining industry of this State was never in better condition than it is to-day. There is less excitement and "boom" and more work than formerly. All over California quartz mines are being opened and developed, and those who have good properties have no difficulty at all in disposing of them to advantage, if they choose to sell. In fact, this demand for developed, paying mines greatly exceeds the supply. Of course there are many "prospects" not yet proven to be mines which are for sale, and do not sell so readily as the owners could wish; but once they are opened sufficiently to become real mines, purchasers may be found.

It is pleasant to know, moreover, that there is more probability of this demand increasing than falling off. The reasons are not far to seek. Silver is quoted at lower prices than ever before; copper is also low; and lead quotations have been unsatisfactory to producers for several years. Men who have been mining for those metals are turning their attention to gold. California is the largest gold-producing region in the United States, and, notwithstanding the various "set-backs" to mining here of late years, the annual product remains about the same.

The restrictions placed by the law on hydraulic mining have caused the miners in this State who formerly engaged in that branch to turn their attention to drift and quartz mines. Many mines abandoned for years have been reopened, and old regions have been reprospected with gratifying results. In some districts old gold mines have been started up by men of means and proved profitable in their hands, which they did not when owned by poor miners.

The fact that some of the deepest gold mines in the State are to-day paying handsomely is encouraging to those who are working in gold quartz. When "pay ore" goes down the mine is bound to pay for a long time. Ore can be worked to-day for less than half its cost 15 or 20 years ago. Provisions and labor are cheap, sources of supply are convenient, means of transportation are at hand, and the climate is favorable for steady work. With these advantages it is no wonder that our quartz mining interests are advancing. There is a good, healthy feeling in this branch of mining, which augurs well for its future. All over the State miners are at work, prospecting for and opening mines, and everywhere are the quartz mills pounding away on ore and turning out the gold bullion. The signs of the times are that California will soon show a gratifying increase in its gold product, and it even now keeps up in the yield with that of its younger competitors in the mining field, only one of which has been able to excel it in its annual bullion product.

Alaska Mines.

A paragraph is going the rounds of the press which sets forth in somewhat glowing colors the advantages of Alaska as a mining region. It speaks of various quartz mills on the coast, all paying, the placer mining on the Yukon river and the mildness of the climate. The article is somewhat misleading. The quartz mills are very few. The big one on Douglas Island is one of the most complete in the United States and one of the largest, and the mine pays well. But there are only one or two more in the Territory. Most of the quartz claims are undeveloped to any extent. The Douglas Island mine is a sort of quarry of low-grade quartz, and it took large amounts of capital to equip the mine with a snitable plant.

On the coast the weather is not so very severely cold in the winter, but in the interior the cold gets to be extreme. Thirty, forty or fifty degrees below zero is not uncommon in the depth of winter. The placer mining season is, of course, short. Several prospecting expeditions up the Yukon river revealed nothing that would pay to work under the existing circumstances. Lately it is stated that rich finds have been made somewhere along the river, and the miners from the other camps have gone in search of the new placers. Numbers of men have also gone from here to try their fortunes.

The country is not easily prospected. Dense forests, vast bogs and moss-covered tracts hinder travel. Communication in winter is by dog teams, and in summer by canoes. The country

is thinly settled and there are few towns or villages. People who go there must have well-filled purses and be prepared to undergo hardships and cold. Of course, at the coast settlements where there are towns, the miner would be all right, but once away from there he is in a wilderness where he must depend on his own resources. There are thousands of miles of unexplored region for the prospector to roam over if he cares to try his chances, but if he finds quartz mines in such places they are of little use. There are no roads at all. Placers, if they are very rich, would do quite well, or even if only three or four months' work could be done in a year they might pay to run. But men must bear in mind who go there that it is a hard country for a poor man, and it is no place for the "dead broke" to start for. Nothing very definite is yet known of the new placer fields, and the finds may have been greatly exaggerated.

Nominal Capital and Market Value.

A great many people have a mistaken idea as to the "capital" of mining companies. They see in the newspapers a notice of the incorporation of the "Great Horn Spoon Mining Company, with a capital stock of \$5,000,000 in 500,000 shares." They think that this must be a big company. But those who know how such things are done understand that there may have been only money enough actually subscribed to pay for filing the articles. Numbers of companies never had \$500 in the treasury at starting, and most of them want to sell a few shares for an actual working capital. Often the men whose names are used as incorporators have had shares given to them, and occasionally subscribe for more to start the company going. Again, the stock may be given a fictitious value of \$100 per share, and he sold for ten cents.

The census officials during their investigations received returns from 104 mining companies, whose aggregate capital stock was \$1,014,111,250, and the market valuation was only \$89,641,222. Some 43 of these companies, for instance, were Nevada incorporations with an aggregate capital stock of \$509,045,000 and a nominal market value of \$20,170,910. These show a representative example of the difference between nominal capital and market value.

The practice as to capitalization varies with the locality of the market rather than the value of the property. Even the quoted market value is largely fictitious, sales of a few shares often bringing much greater prices than could be obtained on any considerable portion of the entire property. A very large part of the best mines, too, are not on the market at all, and their owners, even if they desired to sell, could only tell the asking price, not that which could be realized.

We often see in the telegraphic news mention made of mining companies being organized with hundreds of thousands of capital. This always means capital stock, not capital, and it costs nothing to add a few ciphers to make the figures look imposing. It is very seldom we see a company organized with so small a capital stock as \$50,000, though of late years the practice is to reduce the figures materially from the old custom.

It is very hard to place an exact value on a piece of mining property. Mr. Alexander Del Mar has lately told them in London that the California custom is to value it at two years' product, or at the most three. That is, if the mine produces \$40,000 a year it is worth \$80,000. But that gentleman will find it hard to convince Californians that any such custom exists, or ever did exist; for a mine producing \$40,000 a year would sell for more than \$80,000 unless it was nearly worked out. There are so many circumstances to be considered that the price paid for one mine can scarcely form any basis for the value of another.

GOLD AND SILVER are reported as having been found in Boone and adjoining counties in West Virginia, by a "returned" California miner. The dispatch which announces this is as usual in such cases very vague, and again, as usual, there is immediate talk of a "syndicate" being formed to purchase a mine with a 22-foot shaft.

A DAILY train of 115 cars is now required to transport Comstock ore over the V. & T. Railroad to the stamp mill on the Carson river.

California Clays.

Clays of varying excellences are widely distributed in this State. Nevertheless, there are not more than a dozen potteries being operated, and all of these work mainly on the coarser sorts of crockery, such as stone jars, jugs and crocks, flower-pots and vases, ironstone, sewerage and drainage pipes, tiles, stove and flue linings, well tubing, water filters and coolers and receivers, and chemists and assayers' materials, fire-brick, terra cotta, etc. These establishments employ about 300 men, and the capital invested is about \$400,000. In the coast counties the potteries are operated all the year round without intermission. Those situated farther in the interior suspend operations during the winter, with the exception of the larger establishments, where work is done indoors. The long dry seasons of California greatly favor the business, enabling the potter to very effectually dry his wares and perform much of his work in the open air.

This industry has not grown very much, however, because there has been a limited market, owing to excessive foreign importations of such products. Table wares and better descriptions of pottery ware have not been made here as yet, those involving elegance of design and artistic skill having been neglected. Kaolin—porcelain clay—has been reported as found in a few localities, but no deposit of any size has been systematically worked or utilized in making porcelain.

State Mineralogist Hanks, while recently traveling on the stage line from San Diego to the Julien district, accidentally picked up a piece of rock, and on examining it found that it was a fine specimen of feldspar found in Norway. On continuing his investigations he also discovered pegmatite. These minerals are used in manufacturing the finest kinds of pottery and porcelain. Mr. Hanks states that the feldspar and the pegmatite evidently exist in large quantities in San Diego county, and as California also produces good clay, there is no reason why this State should not commence to manufacture the best and finest pottery and porcelain, which is now imported from Europe. Mr. Hanks has notified the principal potters in the State of his discovery. To begin the manufacture, however, would require considerable capital and the importation of skilled workmen. A prime requisite, however, is a good deposit of kaolin. This is known to exist in several places, but as to quantity no proper investigations have been made.

Foundry Notes.

The Union Iron Works were the successful bidders for the construction of the Spring Valley Water Company's Pumping Works at Black Point.

A Duncan concentrator is placed in position ready to be run at any time at the Pacific Iron Works, on First street.

The new engines and plant of the Electric Light Company, on Stevenson street, all made by the foundries in this city, are working very satisfactorily.

A Frishee-Lucop quartz pulverizer, such as described in the PRESS of last week, is running steadily at the Pacific Iron Works.

There are full supplies of pig iron on hand in this city and the consumption is light.

There is very little being done in the line of mining machinery at the city foundries. Several new mills are talked of, but orders are few.

The San Francisco Tool Company has plenty of work in its shop. The company is receiving abundant proof, in the shape of patronage, that its specialty of pumping machinery is appreciated.

A new style of dynamo is running the electric lights in the shop of E. H. Rix, on Fremont street.

Frank Huntington is manufacturing several of his quartz mills for orders. The mill is proving satisfactory, and is now in use in many places all over the coast.

At a meeting on Wednesday evening the boiler makers resolved to order a strike in the Union Iron Works, the movement to be altogether independent of the other iron trades.

The Pacific Rolling Mills have not only the contract for the iron and steel work of the new cable road in Oakland, but are building the whole road-bed, tube and all. The tube is quite large. A full gang of men is at work on the road.

Working Gold-bearing Sulphurets.

Concentration and Chlorination in Nevada County, Cal.—No. 3.

(Written for the PRESS by C. A. SCHENCK.)

Regulating the Concentrators.

Sometimes it happens that the belt travels too much to one side; but this is easily regulated by the last underneath-roller, counting from the head of the table, which goes by the name of the tightener. Screw the hangers slightly up on the opposite side, or loosen on the side to which it travels. It need scarcely be mentioned that to make this correction effective, all the other rollers, big ones as well as small, must be on line, and that the revolving belt and the ash-frames must be level in the direction of their shortest side. In a machine which is in good working order—well oiled and every part in adjustment—so-called sand-corners will be observed on the two long sides, extending from ore spreader to the foot of the table. This is the natural effect of the shaking motion, if the pulp on the table is not too sloppy. The water follows freely the continual change in the oscillating motion, while the sand from its nature is more retarded, and the consequence must be that the sand along the long sides is drier, is mixed with less water, than the balance of the pulp on the belt. The presence of these slight corners of sand is evidence, therefore, that the machine is in good working order, and that the pulp from the battery is not too diluted, in which latter case the corners and all the other stuff on the belt would be sloppy. It would be evidence, on the other side, that not enough water is fed in the battery if the two sand corners spread out too much toward the center line of the table.

It also happens sometimes that sand and water are distributed unevenly on a machine, different from the case just described, the sand working to one side of the table, making a heavy, broad corner, while the other is sloppy. This might be caused by some defect in the machine. Examine, therefore, all its parts; see if the pulp from ore-spreader and water from water-hore are uniformly distributed over the table; correct every jar which might be observed, and examine if the belt is perfectly level in the direction of its shortest side. If all this is found correct or put in order, and there is still no exact balance of the pulp on the belt, a heavy sand-corner forming on one side or the other—a small difference in the force of the swing to one side and then to the other can now be the only cause of the defect. If the momentum, or length of the swing to the right side, is greater than that to the left, a sand-corner is formed on the right, however small the differences may be. Move out, by a slight blow of the hammer, all the bottom bearings of the supports on the opposite side; these supports participate in the oscillating motion. The effect of this correction consists in increasing the force of the swing to this side and in lowering the table the same time; the equilibrium will now be obtained. The same effect can be produced by bending the circular spring in its short bent toward the side having the thickest sands.

Oiling is an important part in the management of Frue concentrators; the gudgeons of the small rollers receive only one or two drops of oil every other day at the Providence. Brasses and boxes of main shaft, boxes of big rollers, worm gear, etc., are oiled every day. Albany spindle oil is used to clean the boxes and gudgeons of the two lower rollers when they gum up and turn hard. Once in a long while the ash-frame is lifted out of its supports, especially if the head roller turns hard. The concentrates are scraped once a day out of the concentration box into a draining box and wheeled to the drying room after draining. Revolutions of crank shaft per minute, 190 to 195; travel of belt per minute, 34 to 36 inches; inclination of belt in 12 feet, three inches.

From the concentration room the sulphurets are wheeled into an adjoining room (provided with high windows) and spread out on the floor made of lumber. All lumps are broken by

means of a shovel in spreading out the ore. No artificial heat is used here to assist in the drying. From this room the sulphurets are wheeled into the furnace house.

Roasting.

The ore contains both silver and gold, and as the first-mentioned metal is also to be extracted in the subsequent process of lixiviation, the roasting has to be performed in such a way as also to suit this purpose.

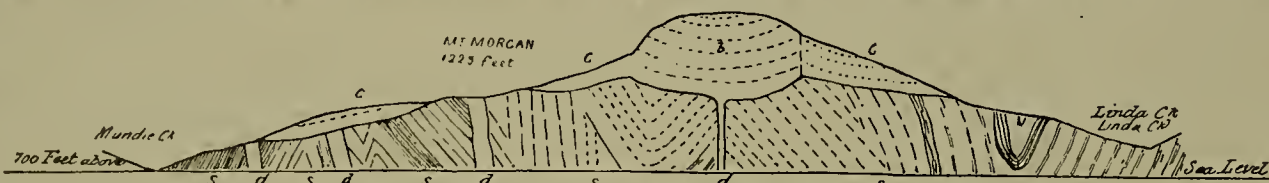
It would be sufficient to give the ore a so-called "dead roast" if gold were only present; that is, to change the sulphides of iron and copper by gradually increased heat into oxides, converting at the same time the small quantities of the sulphide of lead (in the galena) into lead sulphate and lead oxide, of the zinc in the blende into zinc sulphate and volatilizing sulphur, antimony and arsenic in the form of volatile oxides, and also sulphites, oxides of lead and zinc escaping at the same time. The gold would then be in the roasted charge fit for the gold chlorination; any silver would now be present partially in the metallic state and partially as a sulphate and not fit either for amalgamation or leaching as the latter is practiced.

This latter circumstance, in considering the effect of a dead roast on the ore of the district in regard to the silver, necessitates therefore a

phate and also some chloride; zinc into oxide and chloride. All the sulphur is, or ought to be, expelled, with the exception of that in the sodium sulphates. All ferrous sulphates which was formed during the first period should be destroyed, as it would be most detrimental in the following extraction of gold.

Automatic Re-starting Injectors.

We give engravings on this page of Gresham's new patent automatic re-starting injectors for stationary, portable and marine boilers. These injectors took the first prize in the recent Inventors' Exhibition in England. Among their peculiar features the following may be mentioned: They are perfectly automatic and cannot fail to work as soon as steam and water have been turned on. They will work at any steam pressure ranging from 20 to 150 pounds, and may be placed above or below the water supply; if above, they will lift the water with certainty up to 17 feet. They have no handles; a common globe valve on the steam pipe to start the injector, and another on the water pipe to regulate the water supply, is all that is needed. By their re-starting quality they are enabled instantly to take up the feed-water automatically as soon as the supply, which may



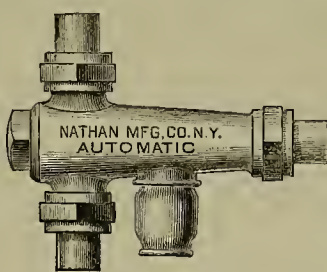
SECTION ACROSS MOUNT MORGAN, WITH CUP-DEPOSIT OF GEYSER.

change in the roasting. This must be carried on in two periods of more or less length in reverberatory furnaces. The first period is an oxidizing one; the second a chloridizing, and during the latter the silver is converted into a chloride at a temperature, which again decomposes any monochloride of gold into its elements, so that the gold remains in the metallic state.

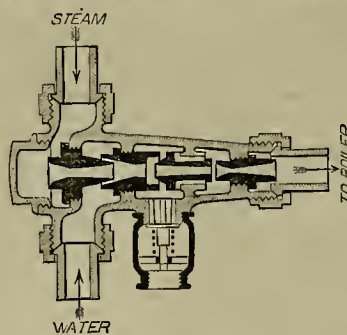
In the oxidizing period, part of the sulphur, arsenic and antimony escape in the form of sulphurous, arsenious and antimonious acids, metal oxides, sulphates, arsenates and antimonates being formed at the same time which are not volatile. If salt is now introduced these combinations are acted upon by the chlorine, hydrochloric acid and vapors of the chloride of sodium; chloride of silver is formed besides chlorides of the base metals, which latter mostly escape. The sulphur which still remained in the ore at the end of the oxidizing roasting, having formed sulphates

he temporarily interrupted, has been restored. It is claimed that they can take up with ease and certainty feed water of a much higher temperature than most injectors. These qualities render them invaluable as boiler-feeders, and particularly adapted to traction and farm engines, which have to run over uneven surfaces; also to tugboats and steamers, which are so liable to have their water supply interrupted by the motion of the waves.

The injector is attached in a horizontal position with the overflow pointing downward. Globe valves of suitable size are placed on both the water supply and steam pipes, and a check valve on the delivery pipe; all these valves should be placed as close to the injector as possible. A fine strainer should be attached to the water supply pipe to prevent the choking up of the injector with chips, weeds, etc. The steam is taken from the dome or top of boiler. The



EXTERIOR.



INTERIOR.

GRESHAM'S PATENT AUTOMATIC RE-STARTING INJECTOR

with the metallic oxides, enters into combination with the oxide of sodium, which is derived from the salt, forming with it sodium sulphate, which does not have any injurious effect in the chlorination and leaching of gold and the subsequent leaching of silver. That part of the sulphur which was yet combined in the form of sulphurets with some of the metals, as lead, silver, antimony arsen, etc., at the end of the oxidizing roasting is taken up by the chlorine, forming there with very volatile chloride of sulphur. The chloridizing period is therefore quite distinguished from the preceding by its absence of sulphurous acid, which was so prolific during the latter. No sparks are observed during the chloridizing period.

At the end of this roasting process the gold is in the metallic state; most of the silver is converted into a chloride, some sulphate and arsenate, and perhaps some metallic silver, may also still be in the ore. Copper and iron are mostly converted into oxides and various amounts of their chlorides; lead is changed into oxide, sul-

phates can be taken out for cleaning purposes by unscrewing the end pieces. Several sizes of these injectors are made by the Nathan Manufacturing Co. H. P. Gregory & Co., San Francisco, are sole agents for the Pacific Coast and Australia.

CABLE ROADS.—The statement sometimes made that cable railroads injure property near which they pass has been amply refuted by the experience in this city, where the contrary has been proven. In Los Angeles they not long since built a cable railroad on a route where there was no traffic, and with the sole purpose of bringing certain lands into the market, so as to sell the lands and also make business for the road.

The French Government has decided to lend 600,000,000 francs more to the Panama Canal Company.

ORANGE trees are being shipped to New Zealand, Florida and North Carolina from Pasadena.

A Curious Gold Mine—No. 2.

In last week's PRESS we gave some diagrams and a description of the Mount Morgan mine, in Queensland, where the gold is supposed to have been brought to the surface by means of a hot spring. One of the diagrams showed the method of building up of geyser deposits and subsequent denudation. Continuing the subject, we this week give a sectional view showing the structure of the mountain. In this cut *a* is the pipe of the geyser (theoretical); *b*, the cup-deposit of geyser; *c*, overflow-deposit of geyser; *s*, metamorphic rocks; *d*, rhyolite dykes. The sectional area of the cup-deposit is only approximately known. The depth of the cup-deposit is not known at all, further than that it must be less than the difference between the levels of the summit of the hill and the bottom of the Dee Valley. Lastly, the distribution of the gold throughout the whole of the cup-deposit is a pure assumption, in making which we are not assisted by a knowledge of any analogous case in nature. But the amount of auriferous rock in sight is enormous, and Prof. Jack states that there is no rashness in believing that it extends over a large area and to a considerable depth.

The mine has a 25-stamp mill, and many thousand ounces of gold have been produced. There is not a trace of silver in the gold obtained, which is said to be 99.7 fine—most wonderfully pure.

As we have stated, the discovery of this mine under these peculiar circumstances may lead to the finding of others in this country. A vast area of the Queensland western interior is covered with cretaceous rocks, and has been covered with sandstone, of which isolated tablelands remain to attest its former wide extension. Beneath the cretaceous rocks palaeozoic rocks undoubtedly extend, and these may contain many ledges or reefs as rich as those which are exposed to view in the ranges near the coast. With a hot spring rising from depths in which auriferous rocks lie, the phenomena of Mount Morgan may be repeated. Where there are "craters" or geyser deposits there might be chances of gold deposits, if these theories concerning Mount Morgan are correct.

Mining Accidents.

Wm. Eddy, superintendent of the Hickey mining property at Dutch Flat, was struck recently by a flying stone from a blast, which broke one of his ribs and smashed a watch which he carried in his vest pocket. His injury was quite severe, but no fatal result is anticipated.

At Lordsburg, N. M., on the 17th inst., Joe Randall and Alex. Rankin, miners, working in the Gibson mine at Victoria, near Gage Station, were instantly killed while drilling out an unexploded charge of giant powder. Both were so terribly torn to pieces that only parts of their bodies were found.

Wm. Phillips, for several years underground foreman at the Heslep mine, Quartz Mountain, Tuolumne county, has had his leg broken by the falling of a rock in the tunnel.

By a cave in the Quartz Mountain mine, Tuolumne county, on the 19th inst., Joseph Faull was fatally injured.

By an unfortunate mistake on the part of the engineer at the Tozer mine, Calaveras county, Clifford Miller, a miner, received injuries from which he died.

On the 23d inst. James McDade, a native of Scotland, aged 32, unmarried, fell down the Ohlston shaft, a distance of 135 feet. McDade was employed in repairing the pumps on the 2100-foot level, below the Sutro tunnel. The supposition is that in a moment of absent-mindedness he walked from the station into the shaft, killing him instantly.

Patrick Sullivan was killed in the St. Lawrence mine, Butte, by falling a distance of 500 feet in the shaft.

The renegade Apaches are making for the San Carlos reservation. Orders have been issued to kill them on sight, and \$2000 will be given for Geronimo or his head.

MECHANICAL PROGRESS.

Slow Power and Friction.

It has been shown that by properly applying a strong, slow moving power, a light-running vessel may be driven at a very high speed, and the question of how to accomplish this is principally a question of friction; for if the slow moving power be taken as a given number of "units of heat," obtained from the combustion of fuel, and transmitted by means of water and steam to the machinery or engines, then if the speed of the engines or piston travel be made too high, the wear and tear and friction use up a large proportion of such power, and the more mechanism there is in motion (that is, the greater the number of the working joints or journals) the more the trouble from the spring or elasticity of the material, the more the cramping and hindering of the posts, which will multiply the friction in a compound ratio of the number and speed of the moving pieces.

How then can this strong, slow moving power be converted into high speed with the least loss from friction? It has been seen that in the case of the wind as a power, a vessel sailing "close by," or within six points of the wind, may run ten miles an hour with a wind that itself only moves at the rate of eight miles. Here the question of friction is simplified down to, first the friction of the wind upon the canvas, and second, the friction of the keel upon the water. These two items of friction are great—far greater than most people would at first imagine; but they are far less than the waste of power in finest machinery man ever made. Wherefore, various and sundry attempts that have been from time to time made to make a vessel travel by means of a windmill driving a paddle or propeller, have all been ignominious failures in speed or economy of power.

Now, it is to be observed that the result spoken of in the case of a vessel sailing on a wind is attained by simply making the line of draught lie at such an angle in relation to the line of direction as shall compel the vessel to run fast to get out of the way of a slow coming wind.

Let the steam engineer also apply his power in a similar manner, and make his line of draught lie at such an angle to his line of direction as shall cause his vessel to run fast to give room for the movement of slow (and therefore possibly simple, durable and smooth-running) machinery.

In this matter the marine engineer compares with his railroad brother as the boy skating on smooth ice compares with the boy running on land, for the railroad man with the present style of locomotive must measure off mile by mile with his driving wheels, while the marine engineer may, with advantage, drive his boat ten miles, while his machinery would run only seven.

Overlooking and ignoring this principle costs many of our largest steamship companies a very large sum, both in coal bills and repairs.

No wonder our steamer-owners groan under their heavy burden while carrying near one-third of their expenses uselessly, either invested in spare boats or wasting in their furnace fires.

Fracture from Centrifugal Force.

The bursting of a wheel makes a very interesting problem to work out materially to agree with an accidental smash-up of an emery wheel. We hear of fly-wheels exploding. They broke all to pieces, smashed into atoms and flew in every direction, simply because the centrifugal force has an outward tendency in every portion of the wheel, and must break across in every diameter within the revolving mass. Take a chain of uniform strength, or a rope of equal size throughout its length, it would not be supposed that every link would give out at once, or that the rope would separate into its integral fibers, simply because every thread and every link is strained to its utmost and is on the point of breaking. The instant that a fracture occurs in any part of the chain, every link is relieved of its strain. The breaking force has no means of being sustained for the remaining portion of the chain to receive the same parting treatment. So with the bursting of a wheel; the breaking strain is in the form of a circle instead of a straight line, as in a chain, and stands ready to part in any point in its circumference. The emery wheel has every tendency to split into any number of radial divergences as in two or three equal parts, but the composition of a wheel of this kind, like everything else, has a place, a division line, that is not as strong as in the rest of the wheel, and when the limit of speed is reached a separation takes place at right angles with the circumference of the circle in just the same manner as with a tension rod that breaks square across with its central line. Only in case of the wheel the out-throw of the entire mass still exerts a breaking strain that increases gradually from the radial fracture till it is the greatest on the opposite side. This bending tendency must continue the fracture till the radial line becomes a diameter and the wheel is broken in halves. What takes place after this may have more to do with the bursting of the fly-wheel than when it exploded on the shaft. A three-line fracture would indicate a disturbance from internal strains due from unequal shrinkage.

STEAM GAUGES NOT INFALLIBLE.—Attention has been repeatedly directed, says the *Iron Age*, to the circumstance that steam gauges for boilers are not infallible, and that occasional comparison of their readings with those of standard and presumably accurate gauges is much to be recommended. Recent complaints among boiler-owners in Germany have given further prominence to the matter, and have pointed also to the important fact, generally overlooked, that the standard gauges themselves are not above suspicion. It was found that in many cases the test gauges used in the official boiler inspections did not furnish the same readings as perfectly new gauges of the kind to be used in every-day work, even when both sets of the apparatus came from the same maker, and the most natural inference to be drawn was that the repeated high pressure to which the so-called standard gauges had been subjected had seriously impaired their proper working. Mercury gauges, we are led to believe, are not generally at the disposal of the German boiler inspector, and boiler-owners must therefore be satisfied with the indications of the test gauges with which he is supplied. Testing the accuracy of these standard devices seems to be, incredible though it sounds, an unusual thing, and steam users appear to have every reason to be rightfully indignant at the existing state of the testing service. One of our German contemporaries points to the urgent necessity of reform in this matter, and its stand should meet with hearty support.

COMPOUND ENGINES.—One important function of the compound engine is the great augmentation of power that may be employed for emergencies, by passing high or initial steam into the compound or expanding cylinder. In this way the power is instantly increased to nearly the proportion between the two cylinders, or as to three to one, for example; and there are various cases when such augmentation, for brief intervals, would be desirable. The distributing valves would require no complication for this purpose, only a pass-over port and auxiliary slide of a simple kind. The compound engine will, because of its success and saving in marine and stationary service, be forced into uses where a loss instead of a gain will result. The higher degree of expansion gained is economy beyond doubt; but this economy is much less than is generally supposed, and easily neutralized by the addition of working parts required. In the case of locomotives, for example, the additional weight required is, in most cases, no objection; but the additional machinery becomes a very grave one, and in running expense soon equals the fuel saved by lower expansion. As a general proposition, separate expanding cylinders are not required or expedient, except in connection with a condenser. The power to which expansion is carried is, in a sense, a measure of the piston area acted upon by the condenser.

TO TEMPER TOOLS.—The quality of the steel should be uniform throughout; indeed, it is always better to have them tempered rather too hard than soft, for use will reduce the temper. If, at any time, it is necessary to perform the operation yourself, the best method is to melt a sufficient quantity of lead to immerse the cutting part of the tool in. Having previously brightened its surface, plunge it into the melted lead for a few minutes till it gets sufficiently hot to melt a candle, with which rub its surface; then plunge it in again, and keep it there till the steel assumes a straw color, but be careful not to let it turn blue. When that is the case, take it out, rub it again with the tallow, and let it cool. If it should be too soft, wipe the grease off, repeat the process without the tallow, and when it is sufficiently hot, plunge it into cold spring water, or water and vinegar mixed. By a proper attention to these directions and a little practice every workman will have it in his power to give a proper temper to the tools he may use. If a saw is too hard, it may be tempered by the same means, but as it would be not only expensive but in many cases impossible to do at home, a plumber's shop is mostly at hand, where the process may be repeated when they are melting a pot of lead. But here observe that the temper necessary is different to other cutting tools; you must wait till the steel just begins to turn blue, which is a temper that will give it more elasticity, and, at the same time, sufficient hardness.—*Industrial World*.

A NEW AND USEFUL ALLOY.—A new alloy that partakes of the nature and appearance of a brass, and also one that resembles nickel plate, has been recently brought out for which great claims are made. The exact proportions with which the metals are mixed, or even what are used, has not yet been divulged. Copper and tin, however, are the main ingredients. The alloy seems to have the properties of effectually resisting the action of the atmosphere, and will not tarnish under ordinary conditions. A dasher handle for a street car that had been hanging in a large stable, where it had been subjected to the action of ammoniacal vapors for three weeks, was barely dimmed in brightness, and it was quickly restored by rubbing with a dry piece of chamois. It is claimed that acids have no effect on it, except those that can touch gold. It is made of various grades and colors and is intended for use in the manufacture of car trimmings, valves, journal hearings, and all other places where the ordinary brass is now in use.

SCIENTIFIC PROGRESS.

DENSITY OF THE SUN.—Speaking of the density of the sun, Professor Lockyer says: If we take water as our unit of density, the density of the sun is 1.444. If we take the density of the earth as 1, then the value is about 0.25—practically a quarter. These values have been determined by taking the volume of the sun as given by the diameter of the photosphere—860,000 miles. Now, we have had to concede 100,000 miles for the height of one atmosphere above the photosphere, and 100,000 miles for another and it is not fair that those atmospheres should be left out of consideration; if we include these atmospheres, though we do not alter the mass, we alter the volume. If we put the same mass into a bigger volume, we naturally reduce the density. Now, if we take the atmosphere of the sun as extending to 100,000 miles above the atmosphere, that will give us a radius of 530,000 miles, instead of 430,000 miles, and we shall, as nearly as may be, double the sun's volume. Therefore we shall have halved the density. Instead of being a quarter as dense as the earth it will only be one-eighth as dense, and, instead of being just denser than water, it will be a little over half the density of water. The gases of the center may put on the appearance, if they do not put on all the physical properties, of liquids; but, be this as it may, in any region that we can get at, unfortunately limited to something like 400,000 miles away from the center, we are undoubtedly dealing with masses of gas.

HOW SAP FLOWS.—The sap of most plants is taken from the soil by the power of causing osmosis, sufficient to raise to what is generally known as "root pressure." In the stem the fluid passes through the vessels or ducts of the pitted cells or plants which, like the pine, have few vessels. These are all minute tubes, in which the sap is supported by capillary attraction, so that root pressure is generally considered to be amply sufficient to force the current to the top of the highest tree. But its motion upward is induced by the pumping action of the leaves, from which large quantities of water evaporate.

The ducts and pitted cells through which the stream flows are not entirely filled with sap, but include bubbles of gas with it. As water is withdrawn from the uppermost cells by evaporation the air in them expands to occupy the additional space, and so exerts less pressure than at first. This allows some of the water lower down to be forced upward and into them by the elasticity of the air bubbles in the other cells, the adjustment going on from above downward—the tendency being to equalize the gas pressure through the entire plant. While evaporation continues this equilibrium is never reached; when it stops the balance may be affected, and the sap remain quiet, supported by root pressure and capillarity, unless some disturbing element is introduced.

A STRAIN INDICATOR FOR USE AT SEA.—Mr. C. E. Stromeier recently described before the British Institution of Naval Architects an instrument that is likely to play a most important part in the future of marine architecture, and indeed in the designing of all large structures of metal subject to high stresses. Briefly described, the instrument consists of thin wire placed between two plates of metal, one being rigidly attached to the structure of the ship or other object to be tested, and the other held by a long wire and a coiled spring. The two plates are thus placed with their surfaces parallel, and only separated by the thin wire referred to, and which has attached to it a light pointer or needle. Upon any movement taking place in either of the plates the thin wire rolls between the two surfaces, and it will easily be seen that in this way the bending of a beam or the elongation of test-pieces when subject to stress can be defined and registered. The idea has not yet been fully worked out, and doubtless improvements in detail will be made; but the apparatus is in a fairly practical form and capable of doing useful work. It cannot fail to have a great future before it, and bids fair to occupy much the same position in relation to naval architecture that the steam-engine indicator does to the steam-engine.

THE HEALTH-GIVING PROPERTIES OF RAIN are not appreciated by the general public. Rain is an essential to physical vigor in localities that have any extensive population. Man and his occupations laden the air with countless and unclassified impurities. The generous, kindly rain absorbs them, even as a washerwoman extracts the dirt from soiled clothes. The ammoniacal exhalations, the gases resultant from combustion and decay, are all quietly absorbed by a hriek shower. People talk about a "dry climate," but it is a snare and a delusion. There is nothing in it. A very dry climate will never support a large population, for it would soon become so poisoned that it would be fatal to the human race. A scattering few might inhabit it, but not the multitude.

A NEWLY-DISCOVERED AND NEWLY-FILLED LAKE.—The discovery of a hitherto unknown lake in the Persian desert was announced at a late meeting of the Vienna Geographical Society. It is at least 25 miles long, and from Mohammedan evidence appears to have dried up after a previous existence, and to have filled up at a quite recent date.

NOTES ON CAST IRON.—Cast iron is stronger in compression than wrought iron, but much weaker in tension. It is not so safe as wrought iron when subjected to impact or suddenly applied loads. If the thickness of different parts varies much, the casting will be strained in cooling. All edges should be well rounded and the hollows filed. Iron expands at the moment of solidification in casting, but contracts in cooling. The contraction varies with the size and thickness of the casting and quality of metal. One-eighth inch per one foot is generally allowed in small patterns for shrinkage. Chilled cast iron is ordinarily cast iron rapidly cooled during solidification, by using a solid cast iron mold protected by a wash of loam, causing a chemical combination of the molten iron and carbon. Very hard. Fracture, silvery. Direction of crystallization strongly marked. Malleable cast iron is made by heating ordinary casting from two to forty hours, according to size, in contact with oxide of iron or powdered red hematite, causing partial conversion into wrought iron by abstraction of carbon. Toughened cast iron is produced by adding to the cast iron, and melting among it, from one-fourth to one-seventh of its weight of wrought iron scrap, which removes some of the carbon from the cast iron and causes an approximation to steel. The melting point of cast iron is 2750° F.; that of wrought iron or steel is 3250° F.

THE MOVEMENT OF GLACIERS.—The cause of the movement of glaciers is still to some extent a disputed question. It was formerly claimed by some that ice was of a viscous nature like tar, and flows under the influence of gravitation, like any similar substance; but experiments have shown that, while ice can be bent in any direction, it cannot be drawn out, but always breaks when pulled apart. So, when a glacier falls over a cliff, it does not flow smoothly over, but is broken up into separate fragments, which reunite again on reaching a more level part of the valley. It is probable that the motion of a glacier is due to the principle of regelation, and that the attraction of gravitation and the pressure of the snow and ice in the upper part of the glacier force it along, while the ice is being continually broken apart and pressed together again, thus adapting itself to all the windings and inequalities of the valley in which it flows.

A NEW THERMO-CHEMICAL BATTERY.—Professor Riatti, the Italian chemist, has brought forward a new kind of thermo-chemical battery, in which the production of the current results from the difference of temperature of two layers or strata lying at different levels in a vessel filled with liquid. This cell consists of a wooden box or vessel, traversed by two copper pipes, placed the one over the other, and separated by a distance about equal to half the height of the vessel, the latter being filled with a solution of the sulphate of copper. A current of steam passes through the upper tube, and a current of cold water in the lower, with the effect that copper is deposited on the latter, while the substance of the former is reduced. By changing from time to time the position of the tubes, equilibrium is established. The battery is said to work well and not to polarize.

INFLUENCE OF THE MOON ON A MAGNETIZED NEEDLE.—M. G. Ligner has made a remarkable communication to the Meteorological Society of Austria. He has ascertained, after a number of careful experiments, that the moon has an influence on a magnetized needle varying with its phases and its declination. The phenomenon is said to be more prominently noticeable when our satellite is near the earth, and to be very marked when she is passing from the full to her first or second quarter. The disturbances are at their maximum when the moon is in the plane of the equator, and greater during the southern than the northern declination.

ORIGIN OF SULPHUR IN COAL.—M. Dieulefait has been inquiring why there is so much sulphur in stone coal, and why there is so little of free alkaline carbonates in the ashes. For this purpose he has analyzed the surviving species of the families of the coal plants, particularly the equisetaceae, and has found in them a proportion larger than usual of sulphuric acid. Hence he deduces, as the answer to his questions, that the coal plants were more highly charged with sulphur than most existing plants, and that for that reason their alkaline constituents assumed the forms of sulphates instead of carbonates.

THE REPRODUCTION OF ELECTRICITY.—M. Marcel Deprez has brought to the notice of the Academie des Sciences an ingenious instrument for reproducing at will an invariable quantity of electricity. It is a voltmeter hermetically sealed, and thus rendered independent of barometric or hygrometric fluctuations. The water decomposed by the current during each operation can be reconstituted afterward by passing a spark between two wires sealed in the upper part of the tube.

ORIGIN OF NITROGEN IN SOILS.—Prof. W. Mattieu Williams indicates as probable source of nitrogen in soils, and serving as food for plants, the bodies of insects, excreta of living insects, invisible spores, microbe and particles of organic fluff which are always floating in the air and liable to adhere to the moistened surfaces of the soil and of the leaves of the growing plants.

ENGINEERING NOTES.

The Panama Canal.

This immense undertaking seems to have reached a crisis. Dr. Wolford Nelson, formerly a member of the Board of Health at Panama, recently arrived at New York from the isthmus, and in an interview has said: "If De Lesseps is correctly reported by the press as saying that half the work on the canal is completed, the statement is willfully misleading to the French people. A fearful crisis has arisen in canal affairs. The company's indebtedness to the share and bondholders now amounts to about \$160,000,000, on which they are paying an annual interest of \$6,000,000. It is reported on excellent authority that the company has exhausted its funds and is working on borrowed capital pending the floating of a new loan of \$120,000,000. For months past this work has been dragging, and quite recently, Boyer, the chief director, called some of the contractors together and requested them not to push the work. This was done, presumably, to cut down the expenditures."

And now comes a still more damaging report from the French engineer, sent over by the government for the special purpose of reporting upon the condition of the work. M. Rousseau, the engineer referred to, reports that the canal company's statement respecting its facilities for construction is incorrect. He thinks it will take more time and cost more money to complete this canal than the canal company have represented. It is now said that the French Minister of Public Works will inform M. de Lesseps that he must reply to M. Rousseau's report, which means, of course, that he must show that the canal company's estimate was correct. The weight of evidence all along has been that the canal company has represented the work on the canal as more extensive than the facts would warrant. M. Rousseau now gives official indorsement of those representations. The canal company will not be allowed to issue the proposed lottery bonds until they have convinced the Minister that their former report is in the main correct.

In the future there is the chance of the Nicaragua canal and the Eads ship railway—the latter having been recommended by the President as worthy of national aid. M. de Lesseps is a man of fertile resources, but the present indications are that he has a work on his hands that will test his best powers.

THE TELEGRAPH IN CHINA.—The most recent link in the long chain of telegraph lines which is spreading with such rapidity over China is the land line from Shanghai to Canton. A line from Peking to Tientsin was opened a few months ago, and the capital of China was connected directly with London. Now the capital of Southern China is joined with the metropolis of the north; and as Canton was put in communication by telegraph with the frontier of Tonquin at the outbreak of the present political troubles in the latter district, the telegraph now stretches in an unbroken line from Peking, in the north, to the most southern boundary of the Chinese Empire, and a message either from London or Peking might reach the headquarters of the Chinese forces on the Tonquin frontier in a few hours. Four years ago the only telegraph line in China was one about six miles in length, stretching from Shanghai to the sea, and erected to inform the mercantile community of the arrival of vessels off the mouth of the river. The next important line constructed by the Chinese Government will probably be one uniting Peking with the great northern line across Siberia at Kiachta. This will have to cross the whole of Mongolia, and will give the capital of China a third alternative telegraph route to Europe, a matter to which some political importance is attached in China. This extraordinary development is due solely to political considerations.

ENGINEERING AT CAMBRIDGE UNIVERSITY.—Old Harvard is fast coming into line as a university where a practical education can be obtained. To some of the old school such changes may appear destructive of ancient traditions. Among other things, the establishment of engineering, as a recognized avenue to a degree in honors is decided on, which will considerably augment the points of contact of the university with the life of the people at large, and will be but a step toward still further realizations of the broadest possible ideal of a university.

CONNECTING THE HUDSON WITH LAKE CHAMPLAIN.—The construction of a ship canal to connect the Hudson river with the St. Lawrence river by way of Lake Champlain, is regarded as a feasible enterprise. A canal 131 miles long would enable vessels of 1000 tons or even larger to go to New York from Chicago two days quicker than boats now go from Buffalo to Albany on the Erie canal, whereas now grain shipments are being diverted to Baltimore and Montreal and other points more and more every year.

A LARGE PULLEY.—In England a pulley 63 feet in diameter, and weighing 83 tons, has just been made. It has grooves for 32 ropes, which together will transmit 1280-horse power, and the rim will have a velocity of more than a mile a minute.

USEFUL INFORMATION.

FIRE-PROOF BUILDINGS.—Few things in connection with buildings, remarks the *Fireman's Journal*, are more generally misunderstood than fire-proofing. The old error that buildings made of incombustible material will be fire-proof has at last been exploded by the destruction of great numbers of structures built in this way. Now vast sums are spent every year in making iron buildings fire-proof, because people have the vain notion that to be fire-proof means to be incombustible. This is a very costly mistake, and it is to be hoped that at some future time it will be understood that buildings may be constructed of brick and wood which shall be as perfectly protected from fire as the huge iron buildings that are now going up. A wooden beam protected from the air will stand a much higher and longer continued heat than iron. The coating of charcoal that has formed on the surface of the wood prevents the penetration of the heat into the interior. If the access of air is prevented, the strength of the wood is not impaired by hours of exposure to a high heat. Demonstrations of this may be seen at almost every large fire. Floors and partitions of wood, if properly defended by the use of plaster, with beams inclosed in a manner similar to that employed for iron, will give, at a comparatively small cost, a very good fire-proof structure. There is, indeed, no reason why all buildings should not be made so nearly fire-proof that any one floor could be burned out without causing damage on the other floors of the same building. This value of a building that will not burn under any ordinary conditions, and which will not take fire readily from a general conflagration, is so great that architects will probably not long neglect this branch of construction. We may expect, before long to find that there are cheap as well as costly ways of fire-proof construction.

REGISTERING THE SPEED OF RAILWAY TRAINS.—The apparatus for registering the speed of trains, in use on the German railroads, has recently been improved. The position of the train at any point on the track is registered by means of an apparatus consisting of two upright vessels containing quicksilver, and communicating with each other, one of which is exposed to pressure on the rail which causes the mercury to fall in it and rise in the other vessel until it reaches a wire and closes a circuit which causes a small knife in the station to cut a square-cornered hole in the strip of paper, which travels at a uniform speed, so that the time when any point on it passed the knife is known. Large numbers of this useful device are now being used on Eastern trains.

ALL is not gold that glitters applies to foils as well as metals in their original metallic state. The painter may purchase gold leaf, which is not gold, but a mere composition, or it may be yellow Dutch metal. For gold leaf he must pay seven or eight dollars for a pack of say 500 leaves. For the other two kinds of so-called gold foil he need pay only \$2 or \$2.50. The composition gold leaf has 500 leaves, while the Dutch metal has 1800 leaves in a pack. Then there is the silver leaf, white Dutch metal and nickel leaf. Dutch metal being cheaper, is often used in place of silver leaf.

TELEPHONE WIRES SOON WEAR OUT.—"The life of a telephone wire," said a telephone line-man, "is, as a rule, a very short one. It is much lighter than a telegraph wire, and is constantly liable to be broken. Sudden contractions of frost will frequently break it. It may be worn in two by chafing against brick walls; it may be cut by firemen, or it may be severed by many other agencies. The result is that in four or five years the wire is likely to be worn out. Telegraph wires, which are thicker, usually last much longer."—*Chicago News*.

FIRE-CRACKERS ARE MADE by Chinese convicts, hired by manufacturers from the Government at three cents a day, the work being done inside of the prisons. The paper is made of bamboo fiber. Each cracker is filled, rolled, and pasted by hand, with astonishing rapidity. The powder used is equal in strength to our best blasting powder. In 1884 about 500,000 boxes of crackers were imported to this country. Each box contains 40 packages, and each package from 64 to 80 crackers.

A NEW kind of concrete is now being used for building purposes in Paris. It is composed of eight parts of sand, gravel and pebbles, one part powdered cinders and one and a half parts unslacked hydraulic lime. These materials are thoroughly beaten together, the mixture forming a concrete which sets almost immediately, and becomes in a few days extremely hard and solid. It is said these qualities may be improved by the addition of one part cement.

RED WATCH HANDS.—To make watch hands red this recipe has been recommended: Mix to a paste over a lamp one ounce of carmine, one ounce of chloride of silver and a half ounce of tinner's japan; put some of the paste on the hands and lay them face upward on a sheet of copper, which must be held over a lamp until the desired color is produced.

RATS EATING PUTTY AND PAINT.—Prof. F. H. Storer reports in the Bulletin of the Bussey Institution the results of a series of experiments in the above-named direction. Mice, so it seems, not only do eat putty, but also red lead mixed with putty, without injury. They thrive on the linseed oil used in the manufacture of this most unsavory side dish, and the whitening which forms the other ingredients of "putty" seems to neutralize the evil effects of the lead. The bearing of these facts is important from a sanitary point of view, as Prof. Storer shows that the effects of mice eating away the packing of valves of drains and closets is an immediate frustration of the best efforts of plumbers and sanitary engineers to keep human habitations free from sewer gas. Not content with mice, the professor tried similar experiments upon rats, when it was found that "rats, when kept upon a rather short allowance of oats, ate putty freely." Finally, "the surviving rat was fed with 'plain putty' for a day or two, after which he received and ate (poor wretch) each day, for two days, a ball of putty made with a mixture of equal parts of slacked lime and whitening. He was next given a ball of putty made with a mixture of one part of oxide of zinc and three parts of whitening, together with 2½ grams of oats, and although he ate very little of the ball, he died soon afterward." The chief results of these experiments appear to be the injury rats and mice may do to houses, and the curious protecting effect of whitening as an antidote to such active poisons as red and white lead and carbonates of baryta.

CAR HORSES are the best fed and most carefully looked after of all work horses, yet their average years of service are less than four, on the road; but if taken off in season they will still do good service for some years on farms, where they can work on soft ground.

BIRD OIL.—A large amount of oil exists in the stormy petrel, and when fat, according to Brunnich, the inhabitants of the Faroe islands use it as a lamp, obtaining their light from a wick drawn through the bird's body.

AN AMUSING EXPERIMENT.—Select several cards of different colors, and in the center of each fasten by a little maulage a small, round piece of black paper. Place over the card thus prepared a piece of thin white tissue paper. The variety of hues which the black assumes is very amusing.

TO SOFTEN WROUGHT IRON.—Treat the iron to a low red heat and cool it in soft soap, and then reheat to a low red and let it cool in lime. It makes wrought iron very soft.

GOOD HEALTH.

Our Sleeping-Rooms.

It is to be regretted that paperings or carpetings should ever be used in the sleeping-room. Alas! what evil is lurking in the area of the four square walls which encompass us! What enemy is that, although trodden upon, yet is not subdued! Let the walls of our sleeping-rooms be kalsomined and the carpets removed from the floors. Let the crevices be carefully filled with putty (any one can do this), and the floor neatly painted or stained. A rug at the bedside, with small ones at the bureau and commode (Kensington rugs), will relieve the nakedness of the floor. These should be carried out weekly, thoroughly shaken, and exposed for an hour to sun and wind. Towels and wash cloths used during the day should never remain in the room during the night. I have seen wash cloths, used day after day in a sleeping-room, become sour and musty, emitting a strong odor both disagreeable and unhealthy.

The water-can and the entire toilet set must be kept perfectly sweet and pure. I do not mean merely clean to the eye, but clean enough for a chemist's use. Attention must also be called to the tooth-brush, which should always be thoroughly cleansed after using, and placed handle down, in an upright holder. I have found odor enough about one tooth-brush to infect the atmosphere of a common sleeping-room. In regard to ventilation, open as many doors and windows as permissible, avoiding a draft; but moving air is absolutely indispensable to the health of the sleeper. Let the bed stand as near the center of the room as possible, but on no account close to the wall. No one house-keeper may be able to carry out all of these suggestions, but it is the ideal, or housekeeping as it ought to be, which should be held up to the eye of the reader, that each one may choose what she can best carry out in her daily practice.

HOW TO BRUSH THE TEETH.—This is a matter of no small importance. Most people brush across the teeth from right to left. This matter of brushing will not remove the accumulations from between them, but tends rather to force the debris into the interstices. The brush should be placed against the teeth at the gums, and rotated toward the masticating surfaces of the double teeth. The mouth should then be thoroughly rinsed with tepid water.

SALICYLIC ACID SUET is used in the German army as a remedy for foot sores, etc., instead of the salicylic powder formerly employed. It is composed of two parts of pure salicylic acid and 98 parts of the best mutton suet.

The Mind and the Legs.

Men generally cross their legs when there is the least pressure on their minds. You never find a man engaged in business with his legs crossed. The limbs at those times are straighter than at any other, because the mind and body work together. A man engaged in auditing accounts will never cross his legs; neither will a man who is writing an article, or who is employed in any manner where his brain is actively engaged; when at work in a sitting posture the limbs naturally extend to the floor in a perfectly straight line. A man may cross his legs if he is sitting in an office chair discussing some business proposition with another man, but the instant he becomes really in earnest and perceives something to be gained, his limbs uncross quick as a flash, he bends forward toward his neighbor and begins to use his hands. That is a phase that I believe you will always observe. Men often cross their legs at public meetings because they go there to listen, or to be entertained; they are not the factors in the performance, and they naturally place themselves in the most comfortable position known to them, namely, that of leaning well back in their chairs and crossing their legs. A man always crosses his legs when he reads a newspaper, but is more apt to lie down when he reads a book. He reads the paper, of course, to inform himself, but at the same time the perusal of its contents is recreation for him, and his body again seeks its position of relaxation.

When a man is reading a newspaper and waiting for his breakfast his legs are always crossed, but so soon as the breakfast is brought to him he puts the paper aside, straightens out his legs and goes to work; that is, begins to eat, his mind now turning on the duties of the day before him. Men cross their legs in a ball-room, but it is far from an elegant thing to do, and is not done by those who have been brought up in good society. It is your "three-penny-bit" young man who crosses his legs at a ball, and, would you believe it, I have seen young ladies do the same thing.—*Denver Republican*.

CARE OF THE HANDS.—If the hands are stained, use a handful of clean sand in the water, rubbing it on the stains. This sand can be rinsed off and kept in a dish for daily use. Oxalic acid will take off stains, but it is rank poison and dangerous to have about; it also makes the hands exceedingly harsh. They must be washed thoroughly in tepid water to insure its entire removal, then rubbed with glycerine. The use of too much glycerine makes the hands moist and cold or clammy, and very disagreeable to the touch. Never hold the hands near the fire while rubbing with glycerine, as it dries in places before penetrating, leaving the hands harsh. Many house-keepers have rough hands in winter, which grows very painful, cracking open on the knuckles, the cracks extending into the palms of the hands. They take their hands out of hot soapsuds or starch to hang clothes out in the wind. If they did not use hot water, and the hands were thoroughly dried before going out, this would be avoided. A pair of white woolen stockings, cut off rounding at the ankle and sewed across, with a thumb sewed in, make a very comfortable pair of mittens for hanging up and taking off clothes. Pin them fast to the sleeves with large safety pins before going out, having first stretched the arm upward; then they will not come loose and the wrists will be protected. After bringing in the clothes, if the mittens are put in the clothespin bag they will be kept clean and in the right place. Hands are injured in very cold weather by lack of protection at the wrists, as large veins and arteries are exposed. The blood is chilled in passing into the hands. Every one cannot have handsome, white and shapely hands, but every one can have clean and comfortable hands.

NO WARMTH IN CLOTHES.—It is a mistake, says the *Lancet*, to suppose there is any warmth in clothes. Animal heat is the direct result of change, going on within the body itself. Nutrition by food, and the discharge of energy by exercise, are the sufficient causes of heat. Clothes seem to warm because they prevent the cold air, and objects with a capacity for heat, which surround the body, from attracting the heat generated within its organism. The clothing is simply an insulator. It follows that it should be light in weight, and above all things, it should permit the free and full circulation of blood through every part of the system—to the end of the finger and toe—and that the muscular apparatus of the extremities should be in perfect working order. If we will wear foot-coverings, whether boots or stockings, which compress the feet and render the separate action of each toe impossible, it is simply absurd to expect to be warm-footed. Heat is the complement of work and nutrition; and if a part of the organism is so bound that it cannot work, and its supply of blood is limited, it must be cold. The resort to stouter and heavier clothing under such circumstances is simply ridiculous. Generally it is the stockings that compress the feet. The garter acts as a ligature, and diminishes the blood supply, while the stocking itself acts as a bandage, and impedes the circulation through the extremities.

BISULPHIDE OF CARBON. M. Pasteur thinks, will become the most efficacious of all antiseptics, as it is also the cheapest, costing but a fraction of a penny per pound in large quantity.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

Downs.—Amador Ledger, May 22: Extraordinary progress has been made in draining the shaft. Work was started last Monday week, and by next Monday they expect to have the water all out. Water is raised at the rate of 240 gallons a minute by means of an iron tank. Sinking will be commenced as soon as the pump, now being made at Donnelly & Howard's foundry, is put in. It is the intention to sink the shaft 200 feet deeper before any drifting is undertaken. There seems to be an impression that the ore-body pinched out, and that this was the reason why work was suspended three or four years ago. This is a mistake. There was a fine body of pay ore in the bottom of the shaft, and all the signs favored the impression that the quartz extended to greater depths. The shaft is now 500 feet on the incline; the proposed sinking will carry it down to 700 feet.

South Spring Hill.—This company called for bids last week for sinking the shaft 100 feet deeper. Several bids were sent in, and the contract was to have been awarded last Saturday, but it is probable that all bids will be rejected, and the work done at regular wages. It has also been decided to add ten more stamps to the mill forthwith. This work will be commenced inside of a week. The sinking of the shaft will take about two months to complete. It will give a total depth of 820 feet. The additional ten stamps are expected to be ready by the time that the sinking is finished. The tunnel which is being run from the side hill to connect with the shaft is almost completed. It will be of material service in the drainage of the mine.

Miscellaneous.—The New London, near Plymouth, is looming up splendidly. The rock that has been taken out is exceedingly rich, and all indications point to a permanent paying mine. The owners have purchased the adjoining claim, the Pioneer, from John Evans and others for \$7500, also a tract of land from J. Woolford for \$4000. The Arroyo Seco gravel claim, near Irish Hill, in Lone valley, has been damaged to the extent of \$10,000 by the floods of the past season. The last heavy rains inflicted the greatest damage, covering up the machinery with debris. It is understood to be the intention of the owners to place the claim in running order again. At the Zeile, the repairing of the shaft is still the work on hand. All the difficulties of the cave have been overcome, and they are engaged now in retimbering where necessary. It will perhaps take a month or so to complete the repairs. At the Kennedy they have commenced sinking. The first set of timbers was put in the middle of last week. Mr. Thomas, the underground manager, has strong hopes of developing a mine on this old claim. The gravel claim of J. T. Wheeler continues to turn out remarkably well. Chunks of gold varying from \$100 to \$200 are frequently met with. One piece obtained within the past month is said to be worth about \$140. At the St. Julian a pocket of rich ore was struck last week. The extent of the pocket we have not learned. At the Moore they are about through with sinking for the present, and drifting toward the ledge is in order. This will take a week or more to complete. The mill will be started soon, and probably kept running for some time. The Tellurium, at Pine Grove, is still working. It is the general belief that the ore will pay well if a practical method of saving the gold can be devised. The ordinary mill process appears not to answer for this character of ore. The ore assays handsomely, but the yield by mill process is next to nothing. The Quartz Mountain mill has come to a standstill, to enable some changes to be made in the machinery.

Calaveras.

Riverside Mine.—Calaveras Chronicle, May 22: We have heard it rumored that the Riverside mine, in Hundred-Ounce Gulch, owned by Messrs. Nuner & Lowrey, is about to be sold. As far as the work of prospecting the vein has been carried on, the showing is remarkably good, judging from the specimens of rock we have seen, and warrants great expectations.

El Dorado.

Notes.—Georgetown Gazette, May 22: The Lone Jack mine near Garden Valley on Greenwood road will be started up to-day. A mill is to be erected at once. The Esperanza mine is still sinking. It is said Burlington is to have charge of both mines, the Lone Jack being a short distance to the north. D. C. Lewis, one of the owners of the Lone Jack, will return in a few days. Taylor mine will be in operation soon. Mr. Burlington has returned from San Francisco, and removed his family to the Esperanza mine. The new mill being put up on the Robert Burnham mine, north of Georgetown, will be ready to start up in a few days. The Slate Mountain mine continues to keep its mill busy on high grade ore. Work of development on the Alpine mine is progressing favorably. We learn they are taking out some high grade ore. We are also pleased to hear that Dr. Spencer is drifting on a fine body of pay ore from the shaft on his O. K. mine to the east of Georgetown.

Lotus Notes.—Cor. Placerville Observer, May 22: W. E. Everson and Ralph Heikens, of Coloma, are still driving at the Last Chance mine. They are in some 250 feet with the tunnel, and are now raising and stoping. The ore improves with development, and, on the whole, the outlook is most gratifying. Lewis Stricker, of Coloma, is now working on the Hardscrabble mine, southwest of this place, he having accepted the place made vacant by the resignation of Chas. Schultz. Henry Baumbach still holds his old position.

Grizzly Flat.—Our merchants are looking decidedly pleasant, now that the placer miners are beginning to bring in gold dust, the result of their winter run. J. M. Oxley's claim, near Middle creek, paid \$8.25 per ton to the man, including all work in opening the claim and cleaning up. He is now making another run. The adjoining claim, belonging to W. T. Henson, is looking fully as promising. Kendall and Russell are now cleaning up, and judging from their smiling countenances, they

are pleased at what they see. Philip Oswald is cleaning up, and is elated over the prospects so far. Marshall and Hun are running regularly, and are satisfied with appearances. Tholen and Norman are pushing their work, showing a fine body of gravel. It is reported that the Stillwagon mine is about to be bonded to capitalists. This mine contains high-grade sulphide ore, and with proper appliances for disulphurizing would make a fine-paying property. The Mount Pleasant is making new and rich developments. E. Williamson has a large body of rich gravel, and is succeeding well with his gravel elevator.

Nevada.

Ridge Mining Notes.—Grass Valley Union, May 20: Since the stoppage of hydraulic mining by the Sawyer decree, quartz prospecting has taken the leading place in mining, and some promising developments have been made. At Graniteville a good deal of such work is in progress, and this coming summer a good force of prospectors will be at work. The same can be said of Moore's Flat. McKillican has opened a fine ledge in that part of the county of very rich ore, and is taking out a large amount of gold. At Bloomfield the Derbec drift gravel mine is running full handed, employing over a hundred hands, directly in the mine, and hoisting 300 carloads of gravel daily for washing. De Noon, who has a lease of the old Derbec tunnel, is doing preparatory work and will soon have a full crew breasting out gravel. The Last Chance Company have at last reached the bed-rock, and expect to strike gravel within the next few feet. The Delhi mine, at Grizzly Ridge, is running 30 tons of ore daily through their eight-stamp mill. The ledge is tapped by a tunnel, and there being no hoisting or pumping to be done, the ore is mined and milled at a small cost. Ore of the value of \$250 a ton can be worked at a profit. The ledge ranges in width from 3 to 16 feet and being of a soft nature is very friable and easily reduced. A tunnel is being run to tap the ledge at a low depth, and where good backs can be obtained. Near Columbia Hill there are many quartz ledges which need only exploitation and some capital to commence operations to develop large mines. The Milton Company is prospecting for drift gravel near Cherokee, and from present indications will soon have enough ground opened to require a large force of men. As hydraulic mining seems to decline, more attention is being paid to the hitherto neglected quartz veins, and the salvation of the upper country, where hydraulic mines have been the mainstay, may yet depend upon quartz.

The Mother of the Gravel Mines.—San Juan Times, May 20: The prospectors on the ledge at Armstrong's ranch are down over thirty feet. They have struck rock full of sulphurets, and many pieces of rock that show free gold. The owners of the ledge are greatly elated, and believe they have a bonanza. One of the proprietors, more enthusiastic than the others, swears that they have found the mother of the rich hydraulics mines in this vicinity.

Quartz on the Ridge.—Grass Valley Union, May 22: The quartz discovery on the ridge continues to excite great interest in the vicinity of Sweetland, and the large vein upon which excellent prospects have been found at several different points has caused the tracing of the ledge to the South Yuba, which river it crosses near Jones' Bar, at a point about three-fourths of a mile below the crossing of the Grass Valley and San Juan Turnpike. The ledge shows boldly on the south bank of the river, where other locations have been made, and where the ledge can be opened upon by means of a tunnel. That the ledge crops to the surface in the country south of this point has not yet been demonstrated, but as far as traced from the middle to the south Yuba it is a very strong and well-defined ledge, and if the prospects continue to be as favorable as already obtained very important results may follow to the quartz mining interests of the county.

Placer.

California.—Placer Herald, May 22: Adjoining the Cressus mine in Baltimore ravine, to the west, is the California quartz mine, a valuable property. The rock in the tunnel is very hard, however, in places, costing \$200 a foot to run. Lately it is getting softer. A mistake in measurement was made of 50 feet, and there is about 42 feet yet to run before striking the ledge, when we may expect some good results. The superintendent has had a tedious time, but his faith and perseverance are equal to the task.

Plumas.

Prattville.—Cor. Plumas National, May 21: C. W. Reed, of Sacramento, came up to look after the interests of the Dutch Hill mining property. The company will work the property this year themselves. James Brewer has been selected as superintendent. They will have honest, faithful, competent service. White and McMillan still gather in the "golden sands." They work but a few men, but get good pay. Ellis, Bressler and Firmstone are taking out a large amount of gold on Clear creek. They are making many improvements, and are getting good pay for every day's work. They have eight or ten men at work, but will soon increase their force. C. C. Brown is one of our most prosperous miners, and he says his mine never looked so well as it does this spring. Somehow, every one expects to hear of a great find being made at Sunnyside, though little work is being done there at present. All along the North Fork the feeling prevails that we shall have such a year of prosperity as shall make glad the hearts of ye old-timer, and make the new arrival feel rejoiced that he came.

Spanish Ranch.—Many mines are situated within an accessible radius not a few of which are valuable. The most note-worthy are the Gopher and Badger Hill Hydraulic mines, the Brandy Flat, the Edman, and Hallsted mines, and smaller ones which space does not permit me to mention. All are in full operation, and judging by the amount of dust which is daily brought here and sold, they must pay richly.

San Bernardino.

The Oro Grande Boom.—Cor. Calico Print: The boom has at last reached Oro Grande. Whether we are impelled by sympathy reflected from the San Bernardino boom, or that the mantle of Colton has fallen upon us, I cannot say, but I can say that the boom is here, and that the thun-

der is real, not artificial. Much quiet development is going on in the mines. However, I am not an expert and do not pronounce authoritatively upon the subject. Still, men in whose skilled judgment I have confidence, and in whose integrity full faith, assure me that there have been recent developments in both the eastern and western camps of fine promise for the mining future of Oro Grande. The plain truth, however, is that we are practically without capital to do anything beyond amateur work in our mines. Poor men cannot make much headway in opening even valuable low grade mines in this section; but a good beginning has been made. Mr. Dana has a great pile of assorted ore here from his promising mine in West camp. I have specimens which are quite rich in horn silver. In East camp there are several men at work, on a mine owned, in part, I think, by Mr. J. M. Miller, of Calico, and Mr. Sparkuhle, of Halleck. Mr. McGee informs me that the developments are excellent. There are several other claims which are said to be valuable, prospectively, as among others, those owned by Messrs. Atwood. But we want capital—money to make money. The Oro Grande Quartz mill has been idle since last May; its last work was on old tailings from the King mine of your mining metropolis. Mr. W. K. Aldersley, the former able and go-ahead manager, is here again in charge. That the mill will run in the early future, I do not believe; freight charges are too heavy to transport ore from Calico or Providence, while there is not enough ore available here as yet to justify the mill in recommending work.

Plutarch.—Calico Print, May 22: This old mine of McBride & Miller is leased by Thede & Holberg, of Daggett, who have three men at work under the foremanship of John McBride. The shaft is down 100 feet, and a drift is being rapidly driven in from the bottom of the same, also a drift from the 50-foot level which is in 25 feet. There are about 10 tons of 20-ounce ore on the dump taken from the shaft.

Silver Joker.—This mine was formerly known as the Golconda, and is owned by a Los Angeles party and A. M. Rickert. They have one man at work cleaning and fixing the mine in good working order and also mining a drift to the southwest, which is in about 35 feet. The shaft shows plenty of fine ore, and is down about 15 feet. There is about a ton of closely-assorted ore on the dump. Mr. Rickert feels confident of having a first-class mine and will put on a few more men in a short time.

Blackfoot.—The different parties that had leases on this mine had to quit work on account of their lease expiring on the 15th inst., which they could not get renewed. Waterman & Porter having bonded the mine, so it is rumored, and have put 8 men at work and run a tunnel 100 feet and tapped the place where McBride & Miller had their lease, and are taking out considerable good ore. They expect to put on 25 more men by the 25th of this month, which will make quite a force. Messrs. Waterman & Porter are good mining operators, and when they take hold of a mine it is because they have indisputable evidence that it is a paying proposition. The thorough knowledge they have of mining, from years of careful experience, enables them to manage the properties, which they invest in most successfully and profitably. The Blackfoot will undoubtedly be the scene of lively operations in the near future.

San Houston No. 1.—This mine is leased by Mr. Thos. Meredith, the son of one of the principal owners, who resides in Los Angeles. There are three men at work in the 100-foot tunnel, taking out about half a ton of very good rock each day. There are about three tons of good ore on the dump at present. He shipped six tons of 80-ounce ore to Thede & Holberg's mill at Daggett last week. A. M. Rickert is taking out some very good ore on the Mountain Brow. Dan Edwards is sinking a shaft in a large cliff or projecting rock on the Oregon mine, and has struck some rich ore in a seam which appears to widen as depth is attained. H. M. Hasbrouck is taking out some very rich ore from an opening in the Bismarck at a depth of 50 feet. He has a very curious specimen from the place where he is working, consisting of the roots of a plant covered with horn silver. Ed. Mulcahy, John McDonald and several others have leases on the Red Cloud, near the King mine, and are making a lively scene chloriding on that claim. They seem to be in good spirits over what ore they have in sight. J. B. Whitfield is chloriding on the Oriental, adjoining the Bismarck. A. Barber has a small force of men at work on the Silver Reef, adjoining the Waterloo in West Calico. The following are from our Daggett correspondent: Fred Clark was in town last Wednesday, and says that he has three carloads of first-class ore at Lava station from the Lava Bed district ready for shipment to the mill at this place for reduction. The mine is still looking "way up." Robert Moore, of Santa Cruz, Monterey county, in company with Henry Lake, has returned from Soda lake. Mr. Moore is largely interested in that region, and is well pleased with his investments, having purchased further interests in the district.

Sierra.

Alaska.—Grass Valley Union, May 20: At Pike City, the Alaska is working 150 men directly in the mine, besides a large force of wood men, etc. The water which at the 500-foot level covered the lower pump is now in fork, and the pump in working condition. This is the wettest mine on the coast—90 inches of water is pumped, and as depth is attained the flow increases. The present new pumps can raise 150 inches at their final capacity. The company is having made the largest system of mining pumps in the world; when these are in position they can cope with an unlimited quantity of water.

Forest City.—Mt. Messenger, May 15: There is a good opening for first class miners at Forest City. Bunker Hill Gold Mining Company, at Bunker Hill, in which H. J. Redmond, of Forest, is interested, eight and one-half miles east of Forest City, are running an air drift. They have obtained a good prospect and will resume work as soon as the air tunnel is completed. Length of main tunnel, 700 feet. The Extension and Bald Mountain Companies are working quite a number of men, and yielding fair cleanups of gold. The Extension have commenced cleaning up their creek. A small gold nugget was found, the other day, sticking out of the gravel near the boulders. Supt. Colman, of the Ruby, is busily opening out on his upper lead, 16 feet above the deep channel. The gravel mostly cemented, that

requires blasting, has been followed 150 feet westward, where the bed-rock is pitching; and to the east, 100 feet. Width of lead still uncertain. Gravel averages fair pay. As an old miner remarked: "This is a curious country. One oftentimes hardly realizes where he is, or what should be done to most advantageously progress in developing these ancient and lava-capped rivers, seamed with gold." An incline may, in time, be put down to work the deep channel. The main tunnel is about 3000 feet long, and in excellent order, requiring but little repairs. Under the able supervision of Mr. Colman, this mining property bids fair to become one of the most remunerative in the county.

Shasta.

IGO.—Cor. Republican Free Press, May 22: The mines in South Fork district, as I understand, are progressing as well as could be expected, considering the unfavorable weather which has prevailed. A new stamp-mill is at Anderson, which will be put up by Capt. Atkins as soon as the roads are in a condition to haul the same. Several arastras are kept constantly running on good ore.

Siskiyou.

CLEANUP.—Yreka Union, May 21: Johnny Carroll, of Quartz valley, cleaned up a 100-ton crushing last week, realizing something over \$500. Mr. Carroll will abandon the ledge he has been working, and will shortly begin operations on another which pays \$200 a ton.

ETNA.—Si. Jordan is working a quartz ledge which prospects well, and is running an arastra. China claim piping below Summerville and doing well. Supt. Spooner is working 20 bands at Spoonerville, and is getting off five or six acres per season, 15 to 20 feet of bank, and looks for a big cleanup, having taken out over \$10,000 this season. Two miles above Smith, Campbell and Spooner are running another hydraulic claim which prospects well, and expect a big cleanup. All of them are in good spirits, especially the shareholders. Black Bear is working about 25 men; mill not running at present. John Daggett is running on a new prospect where Black Bear was first struck. Present outlook good, dumps are being filled up with quartz, prospects of June cleanup very good, rock in sight as good as \$100 a ton.

Trinity.

MINING MACHINERY.—Trinity Journal, May 22: Major Toms, of New River, passed through here this week on his way home from San Francisco. He informs us that while in the city he purchased an engine, boiler and Kendall mill, which will be shipped to White Rock via Callahan ranch; also that arrangements were made for a five-stamp mill, amalgamating pan and other machinery, which will be shipped as soon as it can be prepared. The necessity of packing machinery on mule-back to the mines compels it to be made up in smaller pieces than if wagon transportation were possible. Major Toms has great faith in the New River mines, and regards a wagon-road from Weaver's as an important necessity. Bullychoop district is active. New machinery is arriving there and development on the quartz mines is progressing. We shall expect a full report from that section soon.

LOOKING WELL.—Late advices from East Fork report the quartz mines of that new district as showing up well, and confidence is felt in their permanence and good paying qualities. Deadwood is turning out bullion in large quantities and with the utmost regularity. It has become so common to hear of large cleanups at the Brown Bear and McDonald mills, as also at Gibson's and others, that it is no longer considered a matter of news.

A RICH PIECE.—On Wednesday morning, while Frank Portillo's boy was looking over the dump of Portillo & Valencia's mine on West Weaver, the little fellow picked up a piece of quartz and gold which is very rich. The piece weighs 2½ ounces in all, of which not less than an ounce and a half is gold. The quartz is rough and certainly could not have come any great distance. It was washed from the mine during the season's work, and it is not improbable that other pieces have gone through the flume.

Tuolumne.

BUCHANAN.—Independent, May 22: The Buchanan road is nearly completed, and freight is now hauled to Easton's by big teams, where it is transferred to the mine by lighter conveyances. Some has already gone forward and about 40 tons more is at Oakland for the same destination. Lang and Hampton are negotiating for the sale of their mine to an English company. There will be nothing done on the claim until the sale is consummated, when the new company will proceed to work the mine on a large scale.

NEVADA.

Washoe District.

HALE AND NOCKROSS.—Enterprise, May 22: The crosscutting on the 2500 level at the north end shows the same vein of ore developed at that point some months ago, improved in character and increased in size and quantity, indicating something better in Savage ground which it is bordering upon. Nothing new developed in the explorations above the 3000 level. Rich bunches of ore are met with, but what is required is one of sufficient size to constitute a bonanza. The drift south from the 3000 level, or bottom of the deep winze, is being forwarded to meet the drift which is to be run from the Combination shaft when it shall reach that level.

POTOMAC.—On the 3000 level the diamond drill hole which was started 120 feet north of the face of the main south lateral drift last week had to be discontinued on account of faulty formation of the ore vein, clay clogging the drill and cross seams, twisting it almost to the breaking point. It only penetrated about 25 feet, and day before yesterday it was started a short distance from the other in the same crossheader. It is now in about 40 feet, and with good luck will soon enter, and pass through the main ore vein, which is demonstrated to lie on the east side of this drift. No water has yet been encountered in either of the three drill holes.

CHOLLAR.—Excellent progress is being made sinking the Combination shaft deeper, 25 feet additional depth having been made at seven o'clock last evening. The formation is more favorable for sinking than was that of the last section, sunk a few months ago, the bottom having passed through the east clay wall into the regular vein matter itself.

This is, of course, owing to the regular dip—about 45 degrees—of the vein to the eastward. Only 20 feet further will carry it to the 3200 level, after which a sum of 30 feet will have to be sunk, and a station will be opened forthwith for a drift to connect with the drift coming from the Hale and Norcross deep winze on that level. When this shaft reaches the 3200 level its bottom will probably be in ore.

CON. CALIFORNIA AND VIRGINIA.—The daily yield has been increased to over 400 tons, and the assays from battery samples at the mills show an increase of value to about \$17 per ton, being an increase of \$5 per ton over the previous week. The exploration and development work on the 1400 and 1600 levels makes excellent progress, the southwest drift on the 1400 having been carried to its connection with the old stopes; 851 feet is the total length of this drift from the main west drift.

SAVAGE.—The drift south from the 600 level of the Gould and Curry is now about 60 feet into Savage ground, and making good progress toward the main shaft of the mine. It is all the way in good vein matter, principally quartz, carrying considerable mineral. Some of it might be found to pay, by careful selection, but the main object at present is to run through to a connection with the shaft of the mine.

ALTA.—On account of bad air the crosscuts west on the 700 level had to be discontinued for the present and all work is concentrated upon making connection with the old Lady Washington, which will give all requisite air circulation. About 100 feet has to be run in order to make this connection.

BEST AND BELCHER.—The pumps are working well and effectively, the further reduction of the water being resumed three days ago. Sixty-two feet more water remains to be pumped out in order to reach the bottom of the shaft, or 2319 level, which corresponds with the 2500 level of the C. and C. shaft.

GOULD AND CURRY.—The upraise above the 600 level, at the Savage line, is now up 103 feet, and continues in low-grade ore. The crosscuts east and west from the upraise, 45 feet above the track floor of the 600 level, still continue in low-grade ore.

YELLOW JACKET.—About 140 tons continues to be the daily yield from the old low-grade workings above the 1300 level. Meanwhile, good exploration work is being done in opening up further resources.

SIERRA NEVADA.—West crosscut No. 2 on the 520 level has been extended 34 feet, making a total length of 541 feet. Formation, hard quartzite and vein schist.

CROWN POINT AND BELCHER.—Nothing new to mention beyond the regular progress of ore extraction and milling. Daily yield, about 375 tons.

MONTE CRISTO.—The drift west from the new shaft, 150 level, continues in very hard rock and makes slow advancement.

OPHK.—The usual progress is being made in the explorations on the 400 level, with no new features to mention.

KENTUCK.—The old workings hold out finely, and continue their regular daily yield of about 60 tons per day.

Central District.

VALUABLE.—*Silver State*, May 22: Charley Wright, just up from Central district, reports that the Locomotive mine, owned by J. F. Clark, is proving to be valuable property. The ore is shipped to Salt Lake for reduction, and averages 332 ounces of silver per ton. The mine looks better than ever before, and there is a large quantity of ore in sight.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, May 22: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Eureka Con. works—Ernst and Esser mine, 11½ tons; Marguerita, 13; Seventy-six, 3½; Hecla, 1; Last Chance, 3; Silver Lick, 5; Dunderberg, 15; Lord Byron, 10½; Alexandria, 3½; Lizzie L., 18; Norris, ½. To the Richmond works—Mt. Hope mine, 60 tons; Hannan, 1; Atlas, 2; Centennial, 8; Frazier and Molino, 9; Jackson, 63.

Garfield District.

PROSPECTS.—*Hawthorne Bulletin*, May 20: Since the splendid discoveries in the Hendly mine, the excitement over the prospects of Garfield district is greater than ever. All claims there have a real or a prospective value, and there is every probability that capitalists, encouraged by the results of Farrington's mines and the Hendly, will develop many more valuable mines. The district contains the richest silver ores to be found anywhere, and the permanence of the ledges having been established, investors will no longer fear to venture their means, and many years of active, vigorous prosperity are certainly in the future of the camp.

Grantsville District.

TO START UP.—*Reese River Reveille*, May 22: We learn from the driver of the Grantsville stage that Superintendent Kuchell has just arrived at that place from New York, and that arrangements have been made to start up the mines and mill of the company operating there. The mill is a 40 stamp with a White furnace for roasting purposes. The property has not been in operation since '81, when M. San Pedro sold out his interest for \$70,000. The ore in the mine is of low grade for this section—\$35 per ton, but so large is the space between walls that it is said that 10 men could furnish ore sufficient for the stamps. Grantsville is 65 miles from this point by stage, nearly due south on the edge of Lone Valley.

ARIZONA.

SILVER.—*Prescott Courier*, May 22: Frank Altiers keeps right along taking rich silver ore out of the Catocin mine. He is making another 10-ton shipment. A leaky battery at the Groom creek mill has somewhat retarded crushing. Three concentrators are in place and a carload of concentrates will be shipped in a day or two. Mr. Gray puts the value of these concentrates at \$125 per ton, gold. The Del Pasco mill people are doing right well. Ore crushed by them has never paid less than \$50 a ton, free gold. Dr. Farnham is gaining gold by arastrating on Upper Lynx creek.

COLORADO.

IDAHO SPRINGS.—*News*, May 20: Work goes on night and day at the Plutus Co.'s properties. The ore-house dumps and mills are full of good ore. Sunday is like any other day—no cessation of work. The mill for concentrating the ore runs day and night by water power, and treats about 30 tons every 24 hours. The drifts, stopes and all the openings in the mine show ore; in fact, with the exception of the Freeland, we know of no mine in the State that shows more continuous ore bodies. A large number are working their mines on Trail creek. On Fall river, quite a large amount of work is being done by different parties. The Freeland looks well throughout all its workings, and is producing its usual large quantities of ore. The monthly output foots up nearly \$30,000. The Donaldson, under lease to Ben D. Allen, of Mathews & Webb's sampler, is producing large quantities of good ore, and the lessees are making big money. This and the Champion belong to the English company. At the head of Russell a large number are working their mines. The Bird Eagle lode, Virginia Canyon, which is being worked by Denver parties, is shipping a hundred tons of ore to the concentrator. Saturday last a carload of first-class ore was shipped. The miners of Ute Creek are experiencing considerable difficulty in taking care of the water—the snow, melting rapidly, makes it up-hill work without machinery, although a number are working in drifts and holding the water down. The Argo folks have quit sinking until they get their machinery up. They are shipping big quantities of good ore from the drifts and stopes. Johnson, Young & Co., working the Wallace lode under lease, are drowned out for the present, being unable to handle the water with a whim.

IDAHO.

AT QUARTZBURG.—*Idaho World*, May 22: We have heard it said that two men at work in the Pioneer mine at Quartzburg, and owned by the Gold Hill Company, get out ore as fast as the 25-stamp mill, with the aid of a rock-breaker, can crush it. Don't know whether two men on a shift was meant or whether two men during the day get out enough rock to keep the mill crushing day and night. No matter which, the ore is taken out with but little labor. The reason of it is they have a mammoth mine, and it all pays. Dick Cunningham has run about 50 feet on his prospect, the Cleveland, in Garbrius district, and is now, with the assistance of Wm. Tucker, taking out ore, at the depth of about 50 feet, from a pay vein about a foot thick. The walls of the ledge are about 30 feet apart, and it is estimated that taking the entire ledge, the ore will mill from \$10 to \$12 per ton. Although this is good ore, it would not pay to haul it to the mill—the Forest King—which will make a crushing of the higher grade. They now have out about 15 tons. Dick will soon have a crushing made. The Cleveland has not been sufficiently developed to be classed as a mine, but it is at least a very encouraging prospect; and if it continues as it is now, it will prove to be a very valuable piece of mining property.

CEUR D'ALENE NOTES.—*Record*, May 5: Hoffman & Co. have been obtaining good pay on No. 3, in Cougar gulch, but will soon have to stop work on account of a scarcity of water. Dan McCusker and partners have two shifts engaged in piping on their claim between Gold Run and Cougar gulches. No clean-ups have yet been made. The owners of the Webfoot claim in Dream Gulch expect to make a clean-up to-day. They have had but one before this spring, their operations having been considerably retarded by lack of water. The largest clean-up from a single run on any North Side claim this season was that made last Friday in Dry Gulch, when something over \$1,200 was obtained from a run of eleven days, two additional days being required to clean up. Vestal & Co., who have leased the Badger claim, are pushing piping operations with two shifts. The claim is being managed by Nate Vestal and Dan McGrath. All the machinery is now in place at the Golden King mill, and it is expected that it will be in operation by the first of next week—as soon as the link chain for the drier arrives, and it will probably be in by express the latter part of this week. Should it be delayed longer, it is not unlikely that the mill may be started up Saturday and some quartz run through without the aid of the drier. J. G. Chapman, who owns the arastra in Pritchard gulch, opposite the mouth of Dream gulch, will begin operations to-day on ore from the Gold Hunter mine, lying just above the old wash, and owned by John Hoffman. Mr. Chapman is satisfied that he will be able to obtain satisfactory results from the Gold Hunter ore which he expects to work until the completion of the road to the Buckeye Boy mine renders it possible to get ore down from there economically.

MONTANA.

BUTTE.—*Miner*, May 20: Renewed activity all along the line of Butte's mines and mills is the cheerful report of the *Miner* to its patrons this week. The brakemen's strike suddenly collapsed last Sunday, and during the week the Anaconda mine and smelter resumed operations, and are again resounding with the hum of industry. Several new prospects have been opened up since our last report, and the Bluebird Company commenced the erection of their new mill, which will be one of the most complete establishments of its kind in the West. As a whole, the situation is satisfactory.

THE MARIA.—This mine is located about one-half mile north of the Alice, and is owned by Moore Brothers. The shaft of the mine is down 180 feet, from which two levels have been run. During the past week some fine ore has been struck in the east drift.

THE ELM ORLU.—During the past week the hanging wall has been encountered in the large ore body exposed, and it takes three sets of timbers to go through the vein, which is over 18 feet in thickness.

THE LEONA.—A fine body of ore, two feet in thickness, is now in the bottom of the shaft, which assays from \$20 to \$50 in gold. The ore is free milling, and as soon as the stopes are opened out the mine will, no doubt, take its rank as a fine ore-producer.

THE MARGARET ANN.—This mine is located north of the Moulton. Preparations are now being made to hoist the water out of the shaft. In connection with this property is a fine stamp mill, which is new and in first-class order. The present management will no doubt work this excellent property to its full capacity.

CLARK'S COLUSA.—This mine is now producing from 40 to 50 tons of fine copper ore, part of which is placed on the dump for a reserve, as there is now more than enough ore in sight to keep the smelter going for the next two years to come.

THE GOLD FLINT.—This mine had been lying idle about two years when Ed Rodda *et al.* leased it from the owners, Messrs. Clark & Leggett. The lessees removed the water, retimbered the mine, and are now shipping ore to the Moulton mill for treatment.

NOTES.—The shaft of the Alice has been thoroughly retimbered to the 1000-foot level. The Magna Charta is supplying its average quota of ore, and keeps the Alice mill running constantly. Reports from Telegraph Gulch are encouraging. Some very rich gold float has been found, and several prospecting parties are now searching for the lode. In the Three-mile district during the past week some fine discoveries have been made, and it is expected that some rich strikes will be reported during the summer. The Snowdrift, the Harkaway, the Gregory and the Silver Lick, northwest of the Moulton and adjoining the Samanthia, have lately been leased to a syndicate, who have ample capital to work these mines. It is said that operations will commence in good earnest during the present week.

BOYLE MOUNTAIN.—Boyle Mountain, at the head of Warm Springs creek, out toward Smoky, about 15 miles west of Ketchum, is fairly alive with mines and all glittering with ore. In the Sunday mine, adjoining the Ontario of the Boston Company, James Doran and Charles Love began work on a lease last November. In January they began shipping, and in four months they extracted 25 tons of ore, which netted them over \$2,000. The Ontario old workings were leased, December 20, 1885, to Hugh Condon, Andy Nelson, Jim Carrick and Tom Jones. They have extracted about 32 tons of ore, and are still shipping. They will realize handsomely for their work. The Irvine group, under lease to Mike Carey and Ike Habishaw, netted a couple of thousands last summer. In December, another body of ore was struck. The leasers worked 12 men all winter until March 1st, when they cleaned up about \$5,000. In the Tea Broeck, Doc Raymond, Frank Fulford and Mike Carey worked three men all winter and five toward spring. They took out 30 tons of ore that will net about \$2,000 over expenses. This ore will be brought in right along until cleaned up. The Black Horse, adjoining the Ontario, shipped 15 tons lately.

UTAH.

SANDSTONE MINING MATTERS.—*Southern Utah Times*, May 8: Hartman & Co. have about 100 tons of first and second class ore on the Annie ready for shipment. Tecumseh Hill is dotted all over with chlorides and considerable high grade ore is coming to the surface. Dick Jarman has about twelve tons of fair grade ore on the Steel & Lamb, ready for shipment to the River mill. Kimple & Louis are still working the Leeds mine on a lease; they have out in the neighborhood of 500 tons of ore and are waiting the action of the Leathers, prior to shipment. The California and Stormy King are producing their usual quota of ore, and from present indications the ore bodies are assuming larger proportions than ever yet shown. The force on the Thompson has been increased, all working on ore. The new strike continues to pan out beautifully. In a few hours after the rich ledge was uncovered, enough ore was taken out to yield on George L. Harding's newly acquired fourth interest in the Silver Gate mine several hundred dollars more than enough to pay for that interest. It is a splendid property. Bales, Holling & Harding have 300 feet of stoping ground from the point of discovery to the apex of the White Reef.

REVIEW.—*Salt Lake Tribune*, May 15: The warm season does not come on as swiftly as was expected, the air being kept cool by the great bodies of snow in the hills. But the canyon roads are getting better, and ore is coming in freely. The receipts in this city for the week ending May 12th, inclusive, were \$190,476.22, of which \$109,577.30 was bullion and \$80,898.92 was ore—a very large receipt, indeed, of the latter. For the week previous the receipts were \$123,775.49 of bullion and \$28,327.01 of ore—a total of \$152,102.50. The output of the Ontario for the week was 24,371.34 ounces of fine bullion and \$19,685.22 of ore. The Daly produced during the week 982.44 ounces of fine bullion; no ore. All goes well with this property. The week's receipts of base bullion were \$12,270; of fine bars, as reported, \$24,570, evidently not reckoning in the Daly. The Hanauer smelter produced for the week \$25,880 in bullion; the Germania, seven cars, \$15,766.79. The smelters are now receiving full supplies of ore. The Stormont shipped up on the 6th, of fine silver, \$1820. The Horn Silver, at Frisco, is said to have struck an exceedingly rich streak of beautiful ruby and horn silver ore, worth \$3000 per ton, but the extent of it is not given. The Horn Silver has shipped and sold 650 tons of good ore since the resumption of shipments, about six weeks ago.

REVIEW.—*Salt Lake Tribune*, May 22: The roads are getting dry, the snowline creeps higher and higher on the hills, and streams are full from the melting snows. The receipts of ore by the smelters in this valley are at the maximum, and the ore begin to come in from Nevada and other camps freely. The receipts of bullion in this city for the week ending May 19th, inclusive, were \$103,636.48; of ore, \$53,897.60; a total of \$157,534.08. For the week before the total receipts were \$190,476.22, of which \$109,577.30 was bullion and \$80,898.92 was ore. The Ontario bullion product for the week was 29,988.44 ounces of fine bars, and \$18,834.73 ore sales. The Daly output for the week was 10,377.24 ounces of bullion and \$531.45 in ore sales. Base bullion receipts for the week were \$13,950; fine bars, as per current reports, \$29,090. The output of the Hanauer for the week was \$16,800 in bullion; of the Germania, eight cars, \$17,720.06. The Stormont sent up \$3,200 in silver bars.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING MAY 18, 1886.

- 341,867.—GRINDING MACHINE—L. W. Andrews, S. F.
- 342,279.—COMPOSITION FOR REMOVING INK—A. Buchten, S. F.
- 341,877.—LOGGING TRUCK—Thos. Carter, S. F.
- 342,243.—FRUIT DRIER—C. F. B. Caspari, S. F.
- 341,996.—CAN-FILLING MACHINE—A. Cerruti, S. F.
- 342,293.—TEA KETTLE—P. Ford, Tucson, A. T.
- 342,093.—QUARTZ MILL—F. A. Hill, S. F.
- 342,106.—HORSE DETACHER—Keenan & Gardner, Ft. Halleck, Nev.
- 342,108.—FIRE ESCAPE—D. B. Kimball, S. F.
- 342,028.—CAR COUPLING—Frank Miller, Olema, Cal.
- 342,029.—SAW TOOTH—Frederick Miller, Mendocino, Cal.
- 341,936.—VEHICLE BRAKE—J. E. Packard, Mendocino, Cal.
- 342,129.—ANIMAL SHEARS—Paxton & Mahurin, Ukiah, Cal.
- 342,283.—PILE FOR WHARVES—G. S. Pidgeon, San Diego, Cal.
- 342,035.—VALVE GEAR—J. B. Pitchford, S. F.
- 342,036.—ENGINE VALVE GEAR—J. B. Pitchford, S. F.
- 342,139.—SELF-CLOSING GAS BURNER—W. W. Sherman, S. F.
- 341,955.—PROPELLER—A. B. Smith, S. F.
- 341,973.—VALVE STEM PACKING—Chas. Watson, S. F.
- 342,154.—ANATOMICAL CHART—J. T. White, S. F.
- 341,980.—IRONING MACHINE—C. Wo'ff, S. F.

New York Metal Market.

Telegraphic advices dated May 27th, give the following New York prices:

- BORAX—6½¢ @ 7½¢.
- BAR SILVER—\$99¼ per oz.
- COPPER-LAKE—\$11.37½.
- IRON—No. 1, \$17 @ 18.50; No. 2, \$15 @ 16.50.
- LEAD—\$4.85 @ 4.95.
- QUICKSILVER—43 @ 43½¢ per lb.
- The following is the latest from the "New York Metal Market Report":
- COPPER—Steady; Lake offered at 10.25 @ 10.55c. Transferable Notices (Lake) offered at 10.80; Transferable Notices (Chili Bars) offered at 14.50.
- LEAD—Steady at 4.80 @ 4.95c. Transferable Notices (Domestic) issued at 4.82½.
- SPELTZ—Steady at 4.40 @ 4.75c. Transferable Notices (Domestic) issued at 4.60c.
- TIN—Quiet at 21.15 @ 21.30c. Transferable Notices issued at 21.25c.
- TIN PLATE—Dull. Transferable Notices issued at 44.45.
- IRON CERTIFICATES—Quiet at \$16 @ \$17½. Transferable notices (May delivery) issued at \$16½.
- SILVER—New York, 99½¢ per oz. London, 45½d.
- MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ 19.50; No. 2, \$16.50 @ 17.50; Grey Forge, \$15.00 @ 16.00. Hudson River, Grade No. 1, \$18 @ 19; No. 2, \$16.50 @ 17.50; Grey Forge \$15.00 @ 16.00. Southern, Grade No. 1, \$18.50 @ 19; No. 2, \$17 @ 17.50; Grey Forge \$15 @ 16.
- Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, May 21st, \$21.20 @ 21.40; Billion Tin, \$21.40 @ 21.60; Banca Tin, \$21.50 @ 21.65; Baltimore Copper, \$9.75 @ 10.00; Orford Copper, \$9.75 @ 10.00; P. S. C. Copper, \$9.75 @ 10.15; Foreign Lead, \$4.75 @ 4.90; Foreign Spelter, 4½ @ 4¾.

THE WASHINGTON TERRITORY coal miners have been on a strike for several weeks, but on Monday of this week those at Newcastle resumed work regularly. Operations at the Franklin mine have not been resumed, and probably will not be for some time. The Franklin miners feel indignant at the manner in which they have been deserted by the Newcastle men. It will be remembered that when the Newcastle strike began the Franklin miners had no grievances and refused to join in the strike until they were persuaded to do so by several hundred Newcastle strikers, who marched to Franklin for that purpose. The Newcastle men have now made terms and returned to work, leaving the Franklin miners, whom they compelled to strike, locked out.

THE Yuma *Sentinel* is responsible for the statement that an old prospector there recently burned a shirt which he had been wearing for some time and the ashes assayed three and a half ounces of gold.

Highland Springs.

Dr. Bates, proprietor of Highland Springs, Lake county, was in San Francisco a few days since. He reports the prospects for the recreation season in Lake county as very promising. The Doctor has everything in good shape about Highland Springs, and is prepared to make the coming season more enjoyable than ever to his numerous guests. Families, and others who wish to seek quiet rest, or the revivifying qualities of some of the best springs in the world, may well consider the superior advantages of Highland Springs and its beautiful surroundings.

TATUM & BOWEN,

25 to 31 MAIN ST., SAN FRANCISCO, and 91 and 93 FRONT ST., PORTLAND, OREGON.

We have recently furnished the Contractors the Machinery for

LA TRINIDAD
(300 Tons per Day)

—AND—

SILVER QUEEN
(100 Tons per Day).

These Mines are Located in Mexico and owned in London.

The Process is the Wet Concentration and the Plants are, without doubt, the most Substantial and Complete ever built.

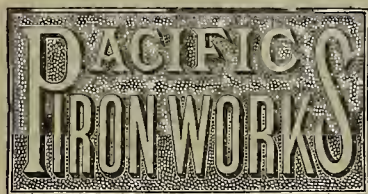


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PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

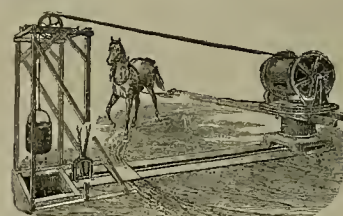
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



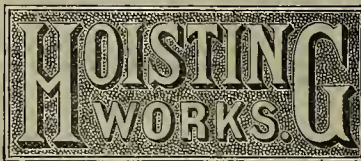
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



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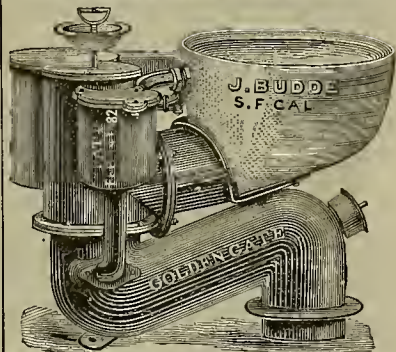
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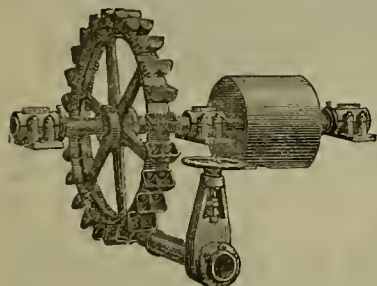
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COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Belmont M Co.	Nevada.	4.	10.	Apr 30.	June 5.	June 28.	J. W. Pew.	310 Pine St.
B. ker David M Co.	California.	11.	25.	May 3.	June 7.	June 28.	D. M. Kent.	330 Pine St.
Cou Amador M Co.	California.	12.	10.	Apr 30.	May 31.	June 16.	F. B. Latham.	327 Pine St.
Champion M Co.	California.	21.	10.	Apr 30.	May 20.	June 6.	T. Wetzel.	522 Montgomery St.
Eureka Con M Co.	Nevada.	9.	1.00.	Apr 20.	May 31.	June 22.	E. H. Willson.	328 Montgomery St.
Grand Prize M Co.	Nevada.	13.	40.	Apr 9.	May 17.	June 7.	R. R. Grayson.	309 Montgomery St.
Hale & Norcross M Co.	Nevada.	91.	50.	May 12.	June 14.	July 7.	J. F. Lightner.	419 California St.
Justus M Co.	Nevada.	3.	05.	Apr 5.	June 7.	July 7.	F. D. Black.	27 Ellis St.
Lucky Hill Con M Co.	Nevada.	4.	25.	Apr 30.	June 6.	June 25.	J. Morido.	328 Montgomery St.
Mayflower Gravel M Co.	California.	30.	20.	Apr 9.	May 14.	June 8.	J. Morido.	309 Montgomery St.
McMillen S M Co.	Arizona.	6.	20.	Apr 9.	May 14.	June 8.	J. Morido.	309 Montgomery St.
Peerless M Co.	Arizona.	8.	30.	Apr 16.	May 21.	June 9.	C. E. Elliot.	309 Montgomery St.
Potosi M Co.	Arizona.	23.	10.	Apr 13.	May 20.	June 16.	A. Waterman.	309 Montgomery St.
Pear M Co.	Nevada.	85.	25.	May 27.	July 1.	July 20.	E. L. Parker.	309 Montgomery St.
Sierra Nevada S M Co.	Nevada.	23.	10.	Apr 21.	May 27.	June 18.	W. E. Dean.	309 Montgomery St.
Silver Hill M Co.	Nevada.	33.	25.	Apr 19.	May 25.	June 22.	J. M. Buffington.	309 Montgomery St.
Union Con M Co.	Nevada.	33.	25.	Apr 19.	May 25.	June 22.	J. M. Buffington.	309 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Crown Point M Co.	Nevada.	J. Newlands.	399 Pine St.	Annual.	June 7
Peer M Co.	Arizona.	A. Waterman.	309 Montgomery St.	Special.	May 29
Peerless M Co.	Arizona.	A. Waterman.	309 Montgomery St.	Special.	May 29

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
California M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Feb 23
Con Virginia & California M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	30.	Feb 12
Derbec Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Feb 9
Holmes M Co.	Nevada.	C. E. Elliot.	309 Montgomery St.	25.	Mar 20
Mono M Co.	California.	G. W. Sessions.	359 Montgomery St.	25.	Mar 10
Manhattan S M Co.	California.	John Crockett.	419 California St.	25.	Feb 17
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar 15
Young America M Co.	California.			40.	Apr 20

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 8.	WEEK ENDING May 13.	WEEK ENDING May 20.	WEEK ENDING May 27.
Alpha.	80	65	85	1.00
Alfa.	20	25	50	35
Andes.	20	30	30	40
Argenta.	1.10	1.10	1.20	1.10
Belcher.	1.10	1.10	1.20	1.10
Belding.	1.10	1.10	1.20	1.10
Best & Belcher.	95	1.00	1.05	1.25
Bullion.	50	50	45	50
Bonanza King.	1.10	1.10	1.20	1.10
Belle Isle.	1.25	1.40	1.70	2.00
Bodie Con.	1.10	1.10	1.10	1.10
Benton.	1.10	1.10	1.10	1.10
Bodie Tunnel.	1.10	1.10	1.10	1.10
Bulwer.	1.10	1.10	1.10	1.10
California.	1.10	1.10	1.10	1.10
Challenge.	1.10	1.10	1.10	1.10
Champion.	1.10	1.10	1.10	1.10
Chollar.	1.10	1.10	1.10	1.10
Con. Imperial.	1.10	1.10	1.10	1.10
Con. Virginia.	1.10	1.10	1.10	1.10
Con. Pacific.	1.10	1.10	1.10	1.10
Crown Point.	1.10	1.10	1.10	1.10
Day.	1.10	1.10	1.10	1.10
Eureka Con.	1.10	1.10	1.10	1.10
Eureka Tunnel.	1.10	1.10	1.10	1.10
Excelsior.	1.10	1.10	1.10	1.10
Grand Prize.	1.10	1.10	1.10	1.10
Gould & Curry.	1.10	1.10	1.10	1.10
Goodshaw.	1.10	1.10	1.10	1.10
Hale & Norcross.	1.10	1.10	1.10	1.10
Holmes.	1.10	1.10	1.10	1.10
Independence.	1.10	1.10	1.10	1.10
Julia.	1.10	1.10	1.10	1.10
Justice.	1.10	1.10	1.10	1.10
Martin White.	1.10	1.10	1.10	1.10
Mono.	1.10	1.10	1.10	1.10
Mexican.	1.10	1.10	1.10	1.10
Mt. Diablo.	1.10	1.10	1.10	1.10
Northern Belle.	1.10	1.10	1.10	1.10
Navajo.	1.10	1.10	1.10	1.10
North Belle Isle.	1.10	1.10	1.10	1.10
Occidental.	1.10	1.10	1.10	1.10
Opitir.	1.10	1.10	1.10	1.10
Overman.	1.10	1.10	1.10	1.10
Potosi.	1.10	1.10	1.10	1.10
Pinal Con.	1.10	1.10	1.10	1.10
Savage.	1.10	1.10	1.10	1.10
Seg. Belcher.	1.10	1.10	1.10	1.10
Sierra Nevada.	1.10	1.10	1.10	1.10
Silver Hill.	1.10	1.10	1.10	1.10
Silver King.	1.10	1.10	1.10	1.10
Scorpion.	1.10	1.10	1.10	1.10
Syndicate.	1.10	1.10	1.10	1.10
Tioga.	1.10	1.10	1.10	1.10
Union Con.	1.10	1.10	1.10	1.10
400 Gould & Curry.	1.10	1.10	1.10	1.10
100 Hale & Nor.	1.10	1.10	1.10	1.10
Yellow Jacket.	1.10	1.10	1.10	1.10

Sales at San Francisco Stock Exchange.

THURSDAY A. M. May 27.	150 Mexican.	40c
500 Alta.	50	45c
200 B. & Belcher.	100	25c
200 Bodie Con.	100	25c
500 Bulwer.	100	25c
50 Chollar.	100	25c
50 Con Va. & Cal.	100	25c
100 Con. Pacific.	100	25c
400 Gould & Curry.	100	25c
100 Hale & Nor.	100	25c
100 Holmes.	100	25c

Mining Share Market.

The situation on the Comstock, upon which the local mining stock market depends, is not such as to raise prices to any degree. The expected developments in the middle mines have not panned out anything yet. A large amount of low-grade ore is developed and exposed, 300 or 400 tons of which, from the lowest levels, are hoisted to the surface and await milling facilities. The deep explorations in Hale and Norcross have developed and exposed a heavy vein or extensive deposit of ore. The same vein was found on the 2600 level, and it has been followed continuously ever since. There is reason to believe that the 3200 level of the middle mines, now commencing to be opened, will prove to be the bonanza level. It will certainly be more thoroughly explored than the levels above have been.

Nothing tangibly interesting has been as yet developed by the diamond drill explorations on the 3200 level of Potosi, or in the commencement investigations of the 600 level of Savage, neither in the Gould and Curry 600-level openings. The drainage of the Osibston shaft is rapidly arriving at completion, and deeper sinking will soon be in order.

THE city of Chico allows no barbed wire fencing within its limits.

THE largest stock of pebbles in the city only at Muller's, 135 Montgomery St., near Bush. x

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Alice, May 15, \$22,496; Moulton, 15, \$12,542; Lexington, 15, \$39,232; Silver Bow, 22, \$15,888; Odessa mill, 22, \$4,000; Holberg & Thede, 23, \$4,100; Oro Grande mill, 23, \$5,350; Germania, 18, \$4,262; Hanauer, 18, \$11,350; Queen of the Hills, 18, \$1,200; Alice, 20, \$10,852; Germania, 20, \$2,306; Hanauer, 20, \$2,630; Queen of the Hills, 20, \$1,150; Stormont, 20, \$2,630; Germania, 21, \$2,360; Hanauer, 21, \$2,610; Queen of the Hills, 21, \$1,150; Hanauer, 23, \$2,865; Nevada ore, 22, \$3,541; Hanauer, 23, \$2,865; Germania, 23, \$2,376. During the week ending Saturday, May 22d, there was shipped from Salt Lake City 26 cars of bullion, 641,219 pounds; 16 cars of iron slag, 415,990 pounds, and 17 cars of ore, 511,580 pounds, making 59 cars, aggregating 1,268,799 pounds.

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, May 27, 1886.

ANTIMONY—Per pound.	12	@	—
Hallet's.	12	@	—
Cookson's.	13	@	—
BORAX—San Bernardino.	1	@	61
Admaga.	22	@	50
LEAD—Glenbrook ton.	22	@	50
Eglinton, ton.	24	@	00
American Soft, ton.	21	@	00
Oregon Pig, ton.	22	@	00
Clippard, No. 1 & 2.	22	@	00
Clay Lane White.	22	@	00
Shotts, No. 1.	23	@	00
STEEL—English, lb.	15	@	—
Black Diamond, ordinary sizes.	13	@	—
Flow.	5	@	6
Machinery.	8	@	10
Sanders Bros.	13	@	—
COPPER—	17	@	—
Brassier sizes.	20	@	—
Fire-hose sheets.	20	@	—
Bolt.	17	@	—
Sheathing.	13	@	14
Ingot.	4	@	15
LEAD—Pig.	4	@	15
Bar.	4	@	5
Pipe.	7	@	—
Sheet.	8	@	—
Shot, discount 10% on 500 lbs.	1	@	—
Drop, 3/4 bag.	1	@	—
Buck, 3/4 bag.	2	@	05
Chilled, do.	2	@	25
ZINC—German.	9	@	10
Sheet, 7x3 ft, 7 to 10 lb, less the cask.	7	@	—
QUICKSILVER—By the flask.	21	@	34
Flask, new.	1	@	05
Flask, old.	1	@	05
TINPLATE—Coke.	5	@	50
Charcoal.	5	@	50

Insurance.

Anglo Nevada Assurance CORPORATION,

Of San Francisco, Cal.

FIRE AND MARINE

Subscribed Capital, \$2,000,000.

OFFICE, No. 410 PINE STREET.

DIRECTORS—Louis Sloss, J. W. Mackay, J. B. Hagglin, W. F. Whittier, J. Rosenfeld, E. E. Eyre, J. L. Flood, E. L. Griffith, G. L. Brander, J. Oreenebaum, W. H. Dimond.

O. L. Brander, President
J. L. Flood, Vice-President
C. P. Farnfield, Secretary
Bankers—The Bank of San Francisco.

NATIONAL ASSURANCE CO., OF IRELAND.

ATLAS ASSURANCE COMPY, OF LONDON.

BOYLSTON INSURANCE COMPANY, OF BOSTON, MASS.

H. M. NEWHALL & CO.,

GENERAL AGENTS,

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A New Invention! The "Perfection" Belt Treats with Universal Joint Movement and Self-adjusting Spirit Spring. Worn with perfect comfort night and day. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDBER, (Druggist) 701 Market Street, con Third, San Francisco.



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BEWARE OF IMITATIONS. TAKE ONLY DR. HENLEY'S.

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The Best Belting for Threshing Machines is our MONARCH RUBBER BELTING, made with Cotton Stays or Flexible Rivets.

We have also the Patent RED STRIP Rubber Belting, and our Superior STANDARD Rubber Belting. Send for Price List of kind wanted.

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Shop No. 3—Cor. 23d and Alabama Streets

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RUBBER HOSE.

FOR SALE BY ALL DEALERS.



The GOODENOUGH HORSESHOE

Gaining Fast on the Slope.

I will forfeit one thousand dollars if I fail to cure toe-cracks or quarter cracks with the Goodenough Shoe and System. Shoes and Nails of the Goodenough Pattern for Sale.

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SANSOME STREET,

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Board and Room, \$1.00, \$1.25 and \$1.50

PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

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Flour and Other Mills. Quartz Mill Screens a Specialty. 147 Beale Street, San Francisco.

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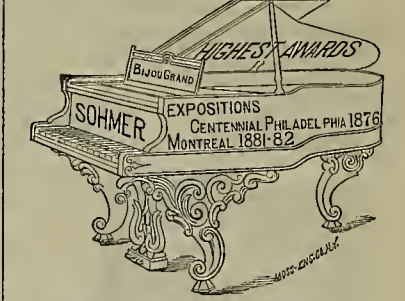
WANTED.—By competent man, a position as assayer or millman; has No. 1 assay outfit. References. Address "M," this office.

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24 Post St. S. F. Send for Circular.

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PEEK & SON PIANOS.

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Cures without the aid of Medicine General Debility, Nervous Prostration, Rheumatism, Neuralgia, Disease of the Liver, Sciatia, Paralysis, Kidney or Bladder, Constipation, Seminal Weakness, Dyspepsia, Female Weakness, Sick Headache, Insipient Catarrh, Insipient Consumption, Lame Back, and many other diseases. For particulars and Circulars address

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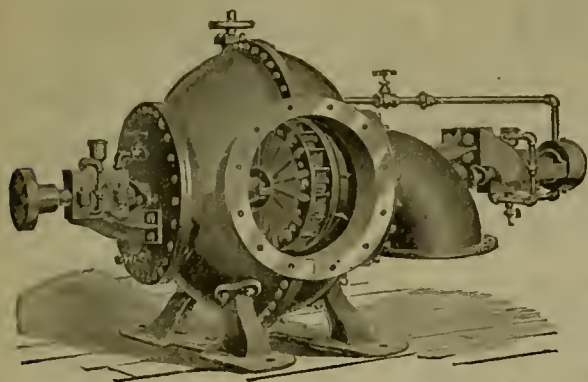
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To Run by Hand or Power. Mining Machinery of Every Description, Drawings, Plans and Specifications.

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.
Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

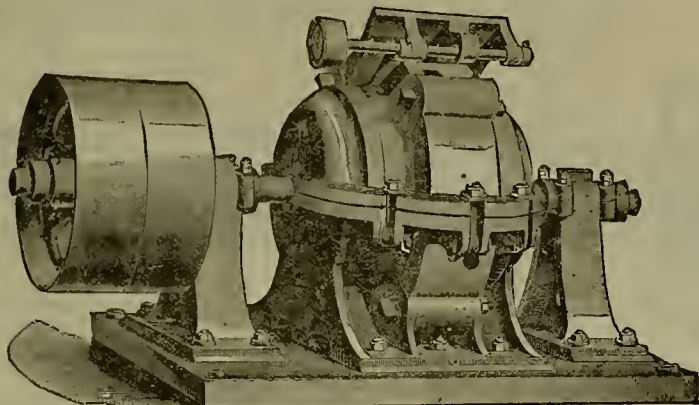
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers,
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Manufactured of BEST STEAM METAL. We claim the following advantages over all other Valves and Gauge Cocks now in use:

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 2. Sand or grit of any kind will not injure the seat.
 3. You do not have to take them off to repair them.
 4. They can be repaired by any mechanic in a few minutes.
 5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.
- In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

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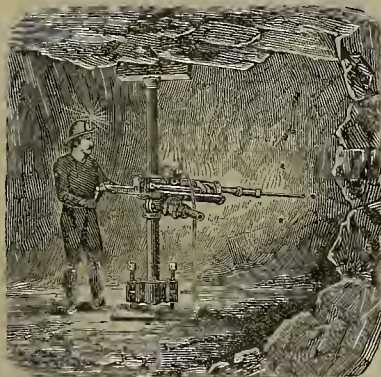
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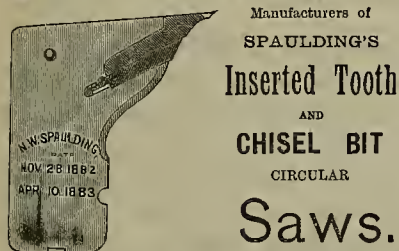
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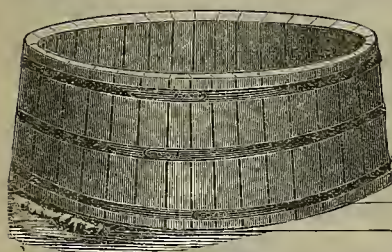
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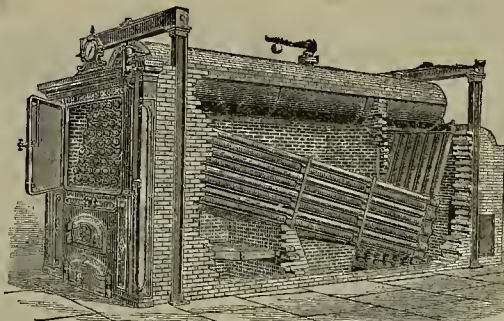
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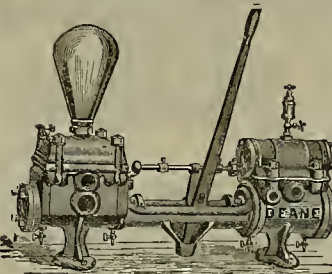
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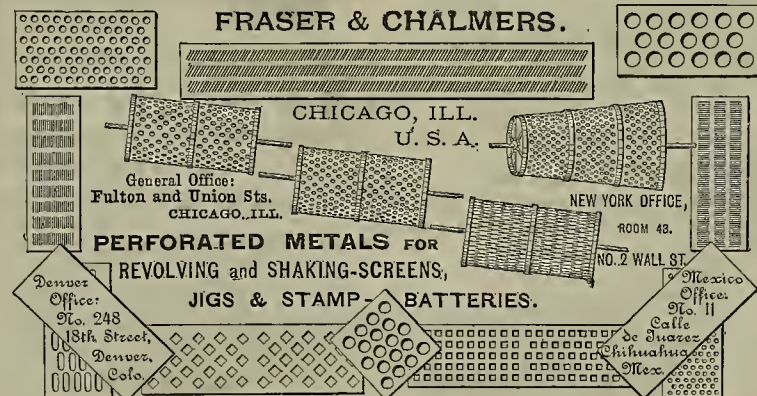
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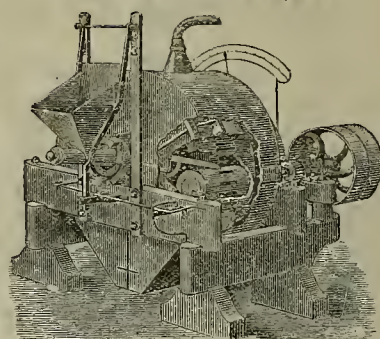
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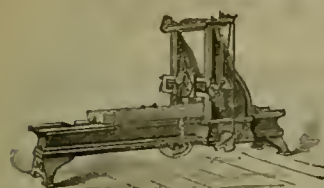
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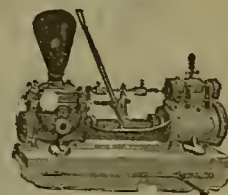
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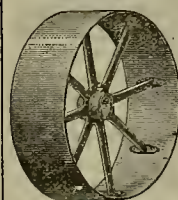
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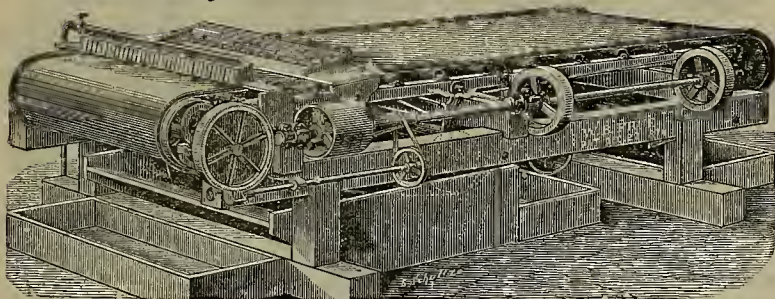
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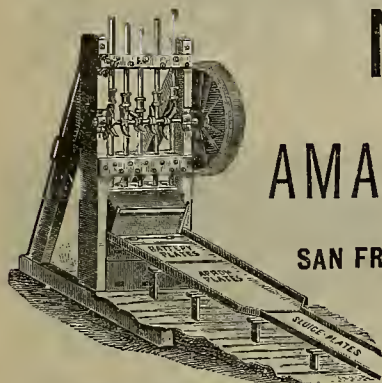
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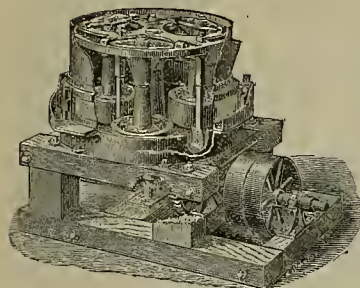
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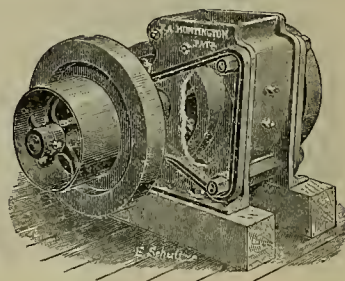


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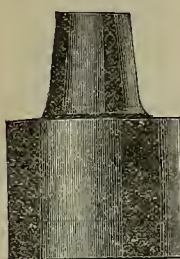
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SAN FRANCISCO, SATURDAY, JUNE 5, 1886.

VOLUME LII
Number 23

The Siphon Centrifugal Pump.

Machinery for Draining Large Tracts.

The San Francisco Tool Company, which has been for some time making a specialty of irrigation and drainage machinery, is now manufacturing a siphon centrifugal pump, combining many advantages over others yet devised for the drainage of large tracts of land. The siphon centrifugal is now adopted in all large reclamation works in Europe, to the almost entire exclusion of the system formerly applied.

Its main features are the connecting of the runner of the pump in a direct manner to the main shaft of the engine, on a level above any possible flood-water; the discharge pipe is conducted over the levee down to a point below the lowest possible low-water mark of the outside stream. No foot or discharge-valves of any kind are used, avoiding all friction otherwise inevitably caused by valves. The pump is charged by means of the vacuum created by the condenser. When the pump is stopped, a water-gate, placed at the discharge of the pump, prevents the outside water from siphoning over the levee into the district; the pump, in the meanwhile, remains charged or primed. For the sake of economy of coal, the use of a compound-condensing engine is recommended. Large hand-plates in the sides of the pump facilitate the examination and cleaning of the runner.

The accompanying engraving represents a 30-inch siphon-centrifugal pump, connected directly to a compound-condensing engine with variable expansion gear, the latter enabling the engineer, without a moment's loss of time, to change the point in the stroke at which the steam is cut off, and to modify the speed and power of the engine as the change of lift or quantity of water desired to be discharged requires.

This engraving was copied from a photograph taken at the moment the engine was ready to leave the works of the Tool Company for shipment. The gate at the discharge, the suction and discharge pipes, are not shown. The relative position of the two steam cylinders, the fly-wheel, heater and jet-condenser, clearly appear; also the connection on the top of the pump with the condenser for the purpose of priming the pump and removing any air which might gather there, by reason of possible leaks or from the air always contained in water. The pipe also furnishes the water for the jet-condenser, which is supplied to it from a point sufficiently high to relieve the condenser pumps of all work of raising it.

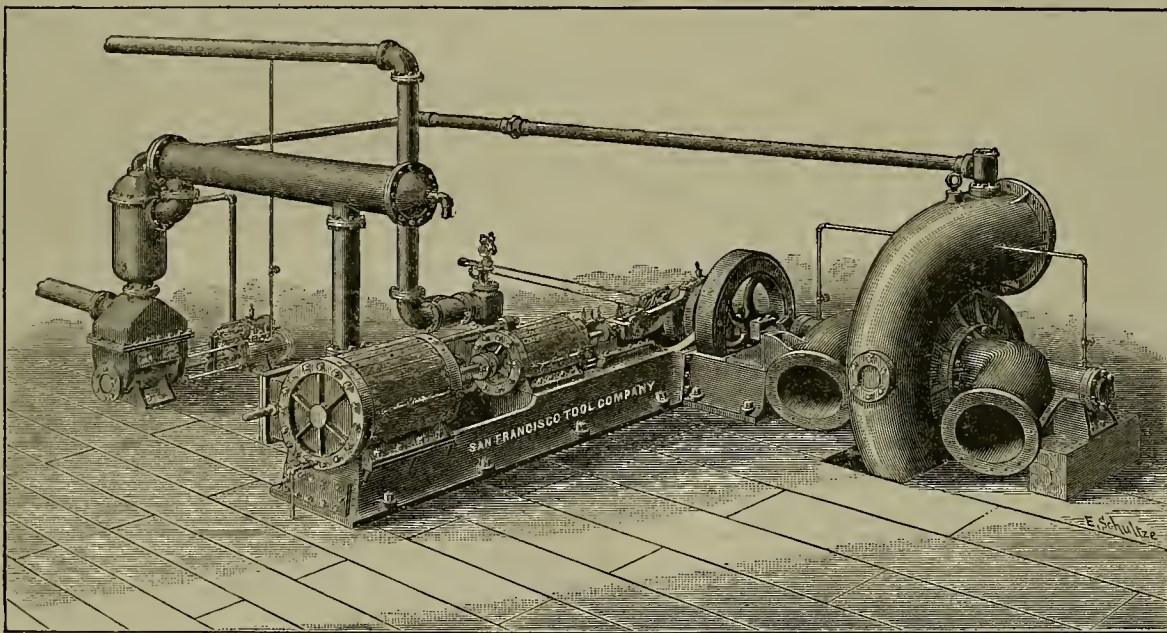
The diameter of the fly-wheel is 58 inches; that of the low and high pressure cylinders 14-inch and 26-inch respectively. In this instance

the diameter of the discharge pipe was increased from 30 inches to 40 inches, immediately after leaving the pump, and that of the suction pipes from 23 inches to 28 inches, insuring a small amount of friction (9½ feet per second, discharging the water running through the pipes at a velocity of 38,000 gallons per minute), which arrangement will speedily save in running expenses the slight excess of first cost incurred. The stroke is 18 inches. The number of revolutions is from 130 to 210 per minute, according to the height the water is to be raised or the quantity desired to be discharged under any given circumstances, which can be increased from a minimum of say 10,000 gallons per minute to a maximum of 60,000

third day of February, when all plans, patterns, etc., had yet to be made. The entire plant was in running order on the tenth day of April following. The foundation consists of 50 piles, 40 feet long, driven to the hardpan. We are informed that the entire cost of the plant, including engine-house, two boilers, 16 feet by 90 inches diameter, and foundation, does not exceed \$20,000, for which sum the Tool Co. thinks it can be duplicated. When such a degree of perfection and such results are now attained by a home company which guarantees all its engines, pumps or tools, and their satisfactory condition, it seems foolish to order from the East from people who are not familiar with local conditions, and whose interest

Although the San Francisco Tool Company is prepared to construct pumps of every description, and to fill any order which may be given it, we are informed by the Company that it believes the siphon centrifugal to combine the greatest advantages, and therefore recommends it to their patrons, by reason of the high duty it insures, the permanency of its construction, the economy of first cost of construction and great saving of running expenses and delays effected. Among the notable advantages insured by this system are the following: 1st. The engine and the pump are above the level of flood water, avoiding the danger of the inside water, in case of a break in the levee or excessive rain water ruining the plant

or preventing the running of the pump. 2d. The pump being connected directly to the engine, avoids the use of all gearing and belts, at least a nuisance, and the weakest and most expensive part of any plant, causing constant stops, breakage and expense. 3d. The siphon prevents the pump from at any time raising the water higher than the exact difference between the two water levels, even enabling one to take advantage of the daily changes of the tide-water. 4th. All the working parts of the engine and of the pump are inside the engine-house and above its floor and within easy reach of the engineer, who can, without disturbing



THE SAN FRANCISCO TOOL COMPANY'S SIPHON-CENTRIFUGAL PUMP.

gallons per minute. In practice, of course, actual experience will show which rate of speed will, at a given height, give the most economical results in the consumption of fuel.

This engine has, like all other engines made by this company, received the greatest possible care in its design and workmanship. The working parts are reduced to the fewest number possible without sacrificing its efficiency, and are thoroughly balanced, enabling the makers to guarantee their engines to run at a very high speed. The bearing surfaces are of exceptionally large area, and the lubricating arrangements most perfect. The most of the forged parts are of the best hammered steel, and all the materials used in their construction, as well as the workmanship, are of the best description.

The average of several tests made May 24th and 25th, conducted personally by the agent of the reclamation company, showed its capacity to be 37,907 gallons per minute, at a lift of 11 feet 7 inches, the engine indicating 156 horsepower, with a consumption of 4.4 pounds average Sydney coal per actual horse-power of water raised per hour—the most satisfactory and economical showing so far made by any pumping plant.

This plant was constructed for the drainage of the Pearson Reclamation District, in Sacramento county. The order was received on the

ceases on the delivery of the shipping receipt.

The Pearson Reclamation District is one of the largest and most successful reclamations on this coast. It consists of 8800 acres of very fertile land surrounded by a superb levee of an average height of 18 feet, 15 miles long. During the extraordinary freshets and floods of the winter just past, the pumping plant, formerly constructed by the San Francisco Tool Company, and consisting of two 15-inch pumps, constructed for its drainage, proved entirely insufficient to cope with the large body of rain and seepage water. On the 20th day of April about 2000 acres were covered with water from 6 to 12 inches deep and 350 acres thereof forming the bed of a lake 5 feet 8 inches deep. Notwithstanding the heavy rains in the latter part of April, and the formidable amount of seepage finding its way through the solid earthen embankments, the 30-inch siphon centrifugal has now drained the entire district, all those lands being now covered with growing crops, even the lake bed being cultivated at the time of this writing.

The pump here illustrated and described is at present pumping the water 14 feet (the difference between the inside and outside water levels), while the inside water is 24 feet lower than the top of the pump. No difficulty whatever is experienced in holding the pump full of water by means of the vacuum, at either a high or low speed of the engine.

any other part, adjust any part of the engine and remove either manhole plate or side plate of the pump within two or three minutes. The great delays and expense experienced in cleaning, examining or repairing submerged pumps are thus avoided. 5th. It obviates all earth-work or interference with the levee (always dangerous), and all masonry or hulkheads. 6th. By opening the gate, a means for irrigation during the summer months is furnished, as the outside water will at once be siphoned over the levee into the district, a most important feature for reclamations in California. Mr. P. J. Van Lohen Sels, the agent of the reclamation district, is highly pleased with the operation of the pump, and testifies to its efficiency and the results referred to above.

A CHANGE FOR THE BETTER.—The Paradise Valley ore delivered at the concentrators two weeks ago averaged \$26.60 per ton assay value. Now the superintendent's report shows that for the last week the average assay value of the ore reduced was \$88.90 per ton. This is a decided change for the better, and we doubt if there is a mine in the State that can equal it.—*Silver State.*

WE would advise miners not to be in too high a hurry to rush into Grantsville—work has not been resumed in the mines there yet.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eps.

Lower Springs Mining District, Shasta County.

EDITORS PRESS:—This district lies four miles west of Redding and two miles east of Shasta, and at the present time has a "black eye." Everything in the quartz business is lying dormant. Nevertheless it will come to the front at some future day. This great mining belt extends many miles distant, perhaps the largest mineral belt on the coast. They are all fissure veins, and most of them prospect in free gold. There has not been anything found here yet to excite capitalists. The greatest depth obtained upon these veins is 40 feet, and this depth is very rare. Numerous chimneys have been found. The best portion of this belt lies north and west of Salt creek. All the veins run in an easterly and westerly direction, and pitching north. At Lower Springs is located the White Oak mine, Eastern Star, owned by Mr. White and wife. These are large veins and prospect well in different places, sufficient to cause two different parties to erect a custom mill upon the ground. But they failed on account of being incompetent in the milling business. The gold is very fine here and requires a first-class mill to save the gold, and an experienced millman to run the mill; otherwise they cannot make a success in any mining camp.

Further to the west of these latter mines is Mrs. Myers' group of ledges, running through the large mountains on the north portion of her patented land, then passing through Mrs. Weiser's section of land. I believe there is millions of money hidden in these mountains of veins. The time is coming when a company of means will probably run a tunnel through these mountains, in order to tap these heavy ledges of gold-bearing quartz. Most of these ledges are in a granite formation. This does not hurt them in the least. Some of them are in porphyry, and some in talc slate formation.

One-half mile north is the Muchmore mine, owned by Muchmore brothers. They are working this mine by tunnel and are working about 40 feet below the surface in the tunnel. They have run upon the ledge about 80 feet, and it prospects well the entire distance. It still continues in excellent ore. They have been working their ore by arrastras until recently, and will take out upward of a hundred tons of ore, afterward talking about a mill. The boys are working this ledge in the proper shape, doing good, substantial timbering as they go along. I will not say as much in favor of this mine as I would like to, but will say that I believe many more exist in this district equally as good as the latter mine.

Lower Springs, May 26, 1886. I. C. F.

Is Mining a Trade?

[Written for the Press.]

With the majority of people a miner seems to be of little importance. His occupation is seldom, if ever, dignified by being entitled a trade; any man who has muscle enough to handle a shovel or throw a sledge is popularly considered as competent to mine. A man may be a "botch" as a carpenter, a blacksmith, or a machinist, but if he has worked a few years at either one of these occupations he is said to have a trade. Not so with the man who climbs the rugged mountain-sides tracing the course of mineral veins, or who delves hundreds of feet beneath the earth's crust; and yet his profession calls for as much skill, as much patience, as much time to learn, as much courage, as much intelligence, and more native good judgment, than any other avocation known.

To be a good miner requires a happy blending of theoretical and practical knowledge. The miner who knows nothing but what his observation and his hooks have taught him is not a good miner; the one who knows nothing except that which he has picked up by experience is not a perfect miner. Both these types are one-sided men.

The good miner should have physical strength to begin with. He must have a good eye for color; it is mainly by color that he recognizes copper, lead, and the numerous silver chlorides, and distinguishes one from the other. He must have some knowledge of geology and lithology; he should know how to use the blowpipe and make an assay; he should have an elementary knowledge of chemistry, understand the use of the compass, have a fair knowledge of hydrostatics, be accurate in arithmetic, know how to set up and burn a pit of charcoal, how to temper picks and sharpen drills, keep a set of account books, and be able to hew a stick of timber square to the line. He must know how to run an arrastra, a pan or a stamp battery. He must have a knowledge of the power of steam, and how to take care of a steam boiler. He wants to know what kind of timber lasts the longest underground; how to build a dam in a stream so it will not leak. He must know

the proper grade to give a flume or a ditch, and understand single-hand, double-hand and power drills. He must know how to timber an incline, a shaft or a drift, sink through quicksand, drive through caved ground, or blast through granite hard as the huf of steel. He must know how to stope a vein only six inches thick and catch his ore on canvas, or work an ore body 200 feet wide, if required, by "square sets" and "cribs." He must be able to pack a pump, tie a howline, splice a rope, fry a slapjack and figure out the discount on a bar of bullion.

Thus we see that the miner is not only a miner but a cyclopaedia also, so to speak, being by turns artist, geologist, chemist, blacksmith, carpenter, engineer, machinist, amalgamator, cook, sailor and book-keeper.

Does the miner do us any good? Let us see. Where does the iron come from that makes our wagons, steam engines, boilers, plows, harrows, hoes, sewing machines, knives and forks, down to needles? From the iron ore dug out of the ground by the miner. Whence comes the coal that smelts the iron and propels our steam vessels and warms us? Dug out of the ground by the miner. Where does the clay come from that makes our chinaware, our soup plates and the coffee cups? Gouged out of the pits in the ground by the miner. Where do we get the tin to make our dippers and milkpans, our copper to sheath our ships and make pins, our lead and antimony to make type for the printer, our five-cent nickels to buy beer with, many of our medicines, our paints, our gold and silver jewelry, our gold and silver money, rubies and diamonds that blaze on the person of beautiful woman, and set off the majesty of kings? All, all, discovered and dug out of the ground by the industrious and modest miner—the only man who can get rich without taking it from some one else. We cannot do without our miners. Take the miner away and the world would all be barbarians inside of 50 years.

C. L. LANG.

Correction.

EDITORS PRESS:—In my article in Xanthates, No. 2, I have said: "I conclude that, in the precipitation of copper by an alkaline Xanthate, two molecules of the precipitant are decomposed for one of the copper salts." If the last six words had read "for one of the copper salt produced," it would have been correct, but I am not so dishonest as to pretend that that was what I meant. It was a genuine error. It is evident that two molecules of the copper salt acted on, and two of the precipitant, must mutually decompose, yielding one molecule of copper Xanthate, two of potassium sulphate (or chloride as the case may be), and one of Xanthic acid. A similar erroneous implication in the third paragraph of my article is efficiently corrected by this explanation. C. H. A.

Nogales, May 25, 1886.

BOISE COUNTY MINES.—The Boise county placers are still turning out a good deal of gold annually, but the amount is insignificant as compared to the years from 1864 to 1872. But while the placer ground is being gradually worked out the quartz mines are coming to the front, and the indications are that the yield of precious metals from the quartz mines will in a few years exceed the most famous yield of the Basin. Boise county has many large and rich quartz ledges, and whenever they have been developed they have paid large returns. The Gold Hill mine at Quartzburg illustrates what can be done through energy and perseverance. There are many other leads, doubtless, just as good as the Gold Hill, but they lack development. The Banner mines further illustrate what may be done by thorough development. Here are some of the best mines in the Territory, but until men of pluck and energy took hold of them they were not considered valuable. Boise county is slowly but surely coming to the front and all that is lacking to again make her famous as a producer of precious metals is capital, energy and intelligent labor.—*Idaho Statesman*.

MINING IN SHASTA.—As an evidence that gold quartz mining is profitable, we call attention to the amount of machinery constantly being shipped here. No industry of the county at present is receiving the attention legitimate mining does, and with only one exception, there have been no suspensions in the past year on a gold quartz mine. Aside from the suspensions and failures in our refractory silver ores, the mining record for the past year in this county cannot be excelled by any county in the State, and yet gold quartz mining in old Shasta is in its infancy.—*Democrat*.

MINING LEGISLATION.—Congressman Symes, of Colorado, has introduced a bill in Congress providing that mining claims, hereafter located, shall not exceed 20 acres; but no claim shall be located before a vein or lode has actually been found. The locators of all lode mining claims hereafter made on the public mineral lands of the United States, or their heirs, shall have exclusive possession of all mineral deposits existing within the boundary lines of any claim in a downward direction. No vein is allowed to be followed outside the vertical boundary lines as first established.

Advice to Prospectors.

The Monitor quartz mine, above Columbia, is being opened by Mr. John Neale, assisted by moneyed men in San Francisco, to whom he has given an interest for developing the property. Were his examples followed by others who own property of this description, it would be better for the community and themselves as well. The time has gone by when fancy prices can be obtained for a hole in the ground upon an ancient reputation of "what has been taken out." Buyers prefer to "see" the vein and test it before establishing a mint in an out-of-the-way place as a speculation. It generally results in all "speculation"—no solid results except blasted hopes. Mr. Neale's philosophy is sound. If you have faith in your mine, and think it valuable, show your faith by being willing to take a part of the chance yourself. Put your labor against somebody's coin, who is willing to meet you half-way. To ask one to put all his capital against your guess is hardly reasonable, unless you can show him something beside opinion or theory. Some men have held this kind of property—valuable, undoubtedly—for years, and being undeveloped, the high figures demanded have prevented a sale. They will hold it years longer, many of them, and in the meantime rustle for bread. Get help to develop it, and take your chances with those who assist you. Then, if your mine proves valuable, you share in the success, instead of continuing to hold dead and unproductive property. If it is a failure, you are no worse off than before, except in imagination.

Many men holding claims would to-day be in comfortable circumstances if they had years ago sold at reasonable figures, or given some one of means a chance to show the profit there might be in developing a valuable mine. If the mine turns out rich, the reserved portion may sell for more than, formerly asked for the whole. If worthless, you have robbed no one, but only induced some party to share equally in your mistake. In the one case you improve your finances; in the other, you are helped to bury your dead mine and set yourself free to find a better one. Years ago, before skill claimed partnership in quartz mining, the Monitor was noted for rich rock and a brilliant future. The old story was repeated here, as in hundreds of other instances. Ignorance, water, disagreements, high wages, waste and extravagance hurt the mine. Shafts caved in, timbers decayed, and tunnels collapsed—leaving wreck and ruin behind. It takes coin to go back to old works and make a mine out of a caved hole. This, Mr. Neale wisely realized. Men do not want to buy a reputation when they bargain for a mine. He puts his faith against their don't know, and the outcome will be a mutual benefit to the parties direct and to the community indirectly. Would that there were more miners of Mr. Neale's enterprise and sagacity.—*Tuolumne Independent*.

Our Johnnie's Composition on a Prospector.

A prospector is a allways rich. His mines is the bigest thing out and any other prospector's mines is no akount. He packs rich specimens when he comes to town and no boddy ever hears of a cabin being robbed. He drinks whiskey for soshibility, but he dont like it. He will lokate you in the extenshun of a mine what shows free gold if you lissen to him huz you all nite, and set them up every five minits and giv him 4 bits in the morning to eat on when he aint too thirsty. You can giv him a grub stake and he will go to the mountains, and lokate a township, and if he finds anything good he lokates that himself, and puts you in the fourth suthery extenshun, and comes back for sum more grub with sum more specimens, sais we got the world by the tale, borrows 10 dollars and gits full. He is a generous man and will share his last slise of bakon with a nother prospector when a har-keep is putting up. He sais a man in this kuntry is like a bronko, no akount less hes broke. It makes him russel. Let a prospector sell a clame for 1 hundred dollars, and sleep in clean sheats, and eat pie for too days at a hash stand, he gits despitick, and his old friends what staked him cant git close enuff to hand him a potato on a fish pole. He works hard for a year on his best cleme, and when he gits a expert to go see it, he steps into the hottom of the shaft and sets down on the dump to look at the lege. He asts the expert 2 hundred and 50 thousand dollars for the prosepck, and if the expert wont take it just now and lone him 20 dollars or treat, he says he is a frod and the kuntry is gon in by the dam Chieyeman.—*Bodie Free Press*.

GOLD MINE LITIGATION.—Judge Sawyer, in the United States Circuit Court, has confirmed the findings of Master in Chancery Houghton in the suit brought by the Pioneer Gold Mining Company against B. F. Baker, and involving the ownership of the Pioneer mine in Sierra county. The Master in Chancery found for the defendant in the sum of \$72,000. Judge Sawyer overruled all objections and exceptions to the findings of the Master.

THE experiments with ore concentrators at the Brunswick mill have demonstrated to the satisfaction of the management of the Yellow Jacket mine that ore heretofore considered too low in grade to pay for the cost of reducing it to bullion can be crushed profitably by the new process.

The Tomichi Valley Smelter.

Mr. N. A. Foss, of Gunnison, Colorado, sends us the following clipping from a local paper: A visit to the Tomichi valley smelter these days almost makes one think that they are in Pueblo or Denver. The work has been pushed from the beginning to the present, and aside from the blast furnace, the machinery is nearly ready to perform its work. The great boilers and their furnaces were finished ready for the fire last week, and on Saturday afternoon smoke came from the stack of the engine room for the first time. The fires were kept up all day Sunday for the purpose of drying out the masonry, the boilers carrying about 10 pounds of steam Sunday afternoon. The finishing touches were put on the two large roasters yesterday afternoon, and last night Superintendent Foss ordered fires to be lighted in each of them, which will be kept burning until they begin to feed ore, probably some 10 days hence. This will thoroughly dry the heavy brick walls by a slow, steady heat, and will leave the ovens in fine condition for receiving the high degree of heat that is necessary to accomplish the desired object. The capacity of these roasters will be from six to eight tons per day each, according to the kind of ore that is being treated.

The scarcity of lumber is here again causing delay and annoyance. The heavy tressel-work on the east side of the building would have been completed before this time, but it has been impossible to get the heavy framing timbers which are used in its construction. It was expected, however, that several cars would arrive last night, and if they came the huge framework will be ready to receive the rails within a week. When these are laid, cars can be run to the upper or receiving floor of the building, from which the ore is fed into the crusher and rolls and is sampled. Then, if it requires roasting, it is fed into hoppers on the same floor which conduct it into the roasting ovens. If the ore is not refractory it is dropped through the trap doors into large bins, whence it is wheeled on to the mixing floor and goes to make up its proportion of a charge for the furnace.

The blast furnace, which is said to have a capacity of 40 tons per day, is in course of construction. It is supplied with wrought iron plates and patent tuyeres, and Superintendent Foss thinks it is one of the most perfect furnaces he has ever seen. The material for a second furnace is on the ground and will be put up as soon as there is enough ore on hand to warrant putting it in blast.

A number of carloads of ore have already been received, part of which is in sacks and piled on the receiving floor, the rest being in one of the large bins adjoining the mixing floor. Mr. L. E. Fry is now out in the camps buying ore, and if a sufficient quantity can be delivered here by June 1st, the works will blow in on that day.

Professor Caldwell, the metallurgist, has his laboratory in one of the small houses east of the main building, and a few minutes conversation with the gentleman makes one feel he is thoroughly acquainted with his chosen profession.

The works throughout have an appearance of solidity and perfection which must be reassuring to the miners who visit them, and within a few weeks a large and steady stream of ore will begin to pour in and a rich stream of bullion to pour out.

Petroleum Items.

There is continued and intense excitement in regard to petroleum in Los Angeles and Ventura counties. A company of San Francisco capitalists are prospecting for oil in the Sespe region, while the great Standard Oil Company are very busy in prospecting the oil basins on the rancho of Hammel & Denker and rancho La Brea.

The continued development of oil in La Puente and Petrolia is very gratifying. A well has been recently bored near Santa Paula, in Adams' canyon, Ventura county, that yields 50 barrels per day. Others will be sunk in a short time.

West of this city, on La Brea, the work of sinking oil wells has begun by a Pennsylvania firm in good earnest. Messrs. Hammel & Denker will doubtless sink some wells in a short time on their portion of the oil basin in the rancho Rodeo de Las Aguas. Oil gushes out of the rocks on this great rancho, as it does in some of the hills in this city.

The artesian well of Mr. Ivar A. Weid, in the Cahuenga valley, is flowing water and petroleum, while two wells sunk for water in this city have reached petroleum. On all sides the petroleum boom is spreading.—*Los Angeles Herald*.

A NEW SIXTY STAMP MILL.—There is an undecurrent of news to the effect that the Ontario Company will commence the erection of a new 60 stamp mill here this summer. Mr. R. C. Chambers has been in San Francisco for some weeks, and it is believed he is there giving orders and closing contracts for the necessary machinery. We have known for some months that such an undertaking was in contemplation, and although we have not as yet been able to learn anything about the matter from headquarters, we believe a new mill will be built, and that the proposed site is in the ravine northeasterly from the Crescent concentrator. We hope such will be the case.—*Park Record*.

Washington Territory Mines.

A correspondent of the *Call*, writing from Colville District, W. T., says:

The Colville mining district is the most northerly settlement in this inland empire. The Hudson Bay Company established a trading post on the east side of the Columbia river, 35 miles south of the boundary line, in 1852, and gave it the name of Fort Colville. From this a small river and the surrounding country took the name of Colville, which is still applied to that side of the Columbia river from the Spokane river to our northern boundary. After all disputes between the governments about territory were arranged it became necessary for the Canadians to retain a military station south of the impassable mountain range near the 49th parallel, to supply surveyors and protect other interests from Indian depredations; so Fort Colville was reserved for that purpose and occupied by the British army at a later period than any other post within the present limits of the United States. While this reservation was controlled by Her Majesty's representative it was under the jurisdiction of English military law. It is now considered a part of the public domain, but has never been surveyed and opened to settlement. The buildings stand to-day as they were built 30 years ago. Stock raising is the chief industry, and horses and cattle are sold to drovers who visit the country annually. Means of transportation have never been provided to market agricultural products, and the home demand has been limited, until the rush occasioned by the discovery of the mines.

The mines are in all directions from this town and distributed over a country 30 by 50 miles. Over 400 discoveries have been reported and 350 locations recorded. Silver in paying quantities has been found in geological formations so different from the usual order that experts have passed over rich ores without detecting any trace of mineral. The greater portion of the ore is galena of low grade. The old Dominion mine, near Chewelah, 30 miles south of this place, is the only ledge that has been efficiently developed to estimate the value with any degree of certainty. Its value is well known and undisputed. Large quantities of picked ore have been shipped to smelting works in the Eastern States, and paid handsome profit, notwithstanding the great expense of hauling on wagons to Spokane Falls and shipment at a high rate over the Northern Pacific road. Large bodies of ore are in sight and on the dump, guaranteeing millions to the fortunate owner. The Ella mine, in the same vicinity, prospects well and promises to duplicate the Old Dominion. Machinery is greatly needed to reduce this ore, as it cannot be transported without great expense, as the nearest shipping point is 60 miles distant. The Gold Hill Company has a ten-stamp mill at their mine, 15 miles southeast from this place. Owing to delay in getting some attachments in position they have done no work to date. Many other mines promise as well as these, but have not been sufficiently developed to justify estimates.

Mines are, as a rule, located in rugged mountains. These are in a level country. A high wall of quartz and granite on the eastward blocks the passage of the eager prospector in that direction; but low spurs spread out like wings to the river, and it was on these that croppings were first discovered that have developed into extensive deposits of precious metals. These ledges sometimes pinch out and cannot be traced below the hard cap which overspreads the whole region at a depth of 10 to 25 feet. Failure to trace the veins below this cap has discouraged prospectors who have exhausted their grub stakes and given rise to the belief that these croppings are only floats. This whole country may have been shaken by some commotion that displaced the surface and spoiled the connection where these veins should have been united below the cap that is quite common in quartz-mining districts. Those who possess means and have prosecuted their researches have been eminently successful. Poor men cannot develop quartz ledges in this or any other camp where a shaft must be run at great expense in almost impenetrable geological formations. This class holds the finds in this district. Capital must come from outside parties before prospecting can be done. Men without means should not rush to this or any other undeveloped quartz field. There are hundreds in the camp who cannot get work, and more are coming every day.

On the west side of the Columbia river there is a large Indian reservation. Croppings of rich ore have been discovered in many places within its borders, but no work can be done on that great portion of the public domain withheld for these shiftless tribes. The Government has spent thousands to build mills and furnish wagons and machinery for these Indians, but the richest mines must lie unworked and fine agricultural lands untouched by the plow. Kettle river valley, and the table land near by, would produce wheat enough to feed all the Indians on the coast, and the mines on this reservation would supply silver enough, if worked, to buy their clothing; but this wealth is lost to the world, and those who wander over it are supported in idleness.

The monthly shipments of salt and borax from Rhodoe, Nevada, a station on the C. & C. Railroad, average 400 tons of the former and 50 of the latter.

A Boiler Inspector Wanted.

The following petition has been filed with the clerk of the Board of Supervisors of this city: The undersigned trades, labor and protective organizations of the city and county of San Francisco, with a membership as herein-after stated, respectfully represent and show as follows:

That in March, 1876, the Legislature of this State enacted a statute providing for the appointment of a boiler inspector for this city and county by the Board of Supervisors, and that although ten years have elapsed since its enactment, no attempt has ever been made by any of your predecessors to appoint an inspector as provided, and that since the passage of said act no less than three serious explosions have occurred in this city, entailing a loss of five lives, which explosions your petitioners believe would not have occurred if said inspector had been appointed and the boilers examined by him as required in said statute.

That your petitioners believe that the enforcement of said law is an absolute necessity as a measure of protection to the working classes who are invariably the sufferers by an explosion, and the sufferers in the respect that a demand for repairs which are constantly needed on boilers frequently leads to the discharge of the employee requesting the same. Your petitioners further believe that said statute represents the will of the people, and was enacted by their representatives with the evident intention of its provisions being enforced, its direction being mandatory to your honorable body, and its requirements establish a precedent followed in all large cities throughout the world.

Wherefore your petitioners request that your honorable board will immediately carry out the spirit and interest of said statute by appointing an inspector as provided, or give reasons why such an appointment should not be made.

Signed by the president and secretary of the Marine Engineers' Beneficial Association, Boiler-Makers and Iron Ship Builders' League, Can-Makers' Protective Union, Machinists' Union of California, Pacific Coast Association of Stationary Engineers, Pacific Coast Marine Firemen's Union, Federated Trades and Labor Organization, Harness, Saddle and Collar Makers' Union, Representative Council of the Iron Trade, Coast Seamen's Union, Amalgamated Society of Engineers, International Furniture Workers' Union, Stone Cutters' Union, Journeymen Shipwrights' Union, Musicians' Mutual Protective Association, International Furniture Workers (English speaking branch), Pattern Makers' Union, Bookbinders' Protective and Beneficial Association, Steam-Shipmen's Protective Union, International Cigar-Makers' Union, No. 225; Boot and Shoe Makers' White Labor League, San Francisco Typographical Union, No. 21; Iron Molders' Union, No. 164. Total, 23 unions, representing 8788 members.

Hydraulic Gravel Elevators.

The *Denver Tribune-Republican* says: The hydraulic gravel elevator plant, two miles this side of Golden, on Clear Creek, is now in successful operation, and is well worthy of inspection by all, and especially owners of placer properties. This plant, with cuts illustrating the same, was fully described in the *Tribune-Republican* a few months ago, just as the cold weather necessitated the shutting down of work, and many persons were disappointed in that they could not see it in operation. Now, any one interested in observing how easily and rapidly vast quantities of gravel are elevated into flume boxes 25 feet above bedrock, can take an early train, witness the process for two hours and return to Denver in time for dinner the same day. There is a large area of rich placer ground in Colorado that cannot be profitably worked on account of not having fall sufficient to give dump facilities, and also because the bedrock is so wet that it cannot be reached by ordinary methods of mining. Plants of this character not only elevate the gravel to such height that dump room is created, but also lift surplus water so that operations can be carried on upon bedrock. Colonel Cummings will be glad to have visitors inspect his working at any time, though the pit will, of course, be larger after ten days' or two weeks' more work, and flumes on bedrock will then be in place, carrying the gravel from the faces to the elevator sump, and the visitor have a better opportunity to understand the full significance and scope of this method of working flat and wet placer deposits.

THEY DEMAND GOLD.—A dispatch from New York says: There are many owners at present in New York, said an uptown real estate broker of prominence yesterday, unwilling to sell because they don't want the money. They will sell for gold, but not otherwise. They will not take the money of the country owing to the continuance of silver coinage. They are willing to sell real estate at the present quotation if they can get gold, but not for money not based on a gold standard. There are owners who would rather hold their real estate. If they sell at all, they insist that the mortgages they accept shall have a stipulation to be paid in gold distinctly expressed. The mania is spreading among those who are not bound to sell, and some financial institutions are already entering upon that policy.

The Eight-Hour Movement.

It has been unfortunate, all around, that the active initiation of the eight-hour movement should have occurred just when other phases of the labor question were in a perfect fever of excitement. For two or three years past the question of shorter hours of labor has been under discussion, and during the past winter the movement took definite shape in a demand to be put into execution on the first of May. Had the demand come at a more opportune time, there would have undoubtedly been a much more general acquiescence in the movement. But it happened to come at a time when moderate counsels seemed to have been remanded to the background, and in their stead came a blow intended to terrify into acquiescence. People conscious of their strength can be much more easily coerced into concessions than driven.

The eight-hour movement is quite a different thing from the question of wages. The demand for eight hours' work is chiefly based upon the acknowledged fact of overproduction under the present system of labor, supplemented by the great aid thereto brought about by the introduction of labor-saving machinery. True, there are cases where the hours of labor are excessive—injurious to health—and should be reduced at all events. But the leading motive of the demand for a reduction of the hours of labor is to make room for the employment of the present idle labor of the country. The proposition will reduce the product of the present utilized labor of the country about 20 per cent. The idea of turning out the same amount of work in eight hours that is now done in ten is mere idle talk. The honest leaders in the movement do not pretend that a man is overtasked by ten hours' work. The question of pay is left as a mere local matter, to be settled as the employers and laborers can agree. The greater leisure secured for intellectual culture is chiefly "hush." A few would thus improve their time—more might. In this, as in the movement for an increase of wages, the socialistic element has crowded itself in, to the great disgust of the better portion of the promoters. The red flag should be put down wherever it appears in this country; it has no place in a land where the people rule. Let it be forced back to the place in which it belongs—where the one-man power prevails.

The Effect of the Eight-Hour System.

If it becomes anything like general, will soon show itself in an advance of prices to correspond to the increase of wages which it may induce, if any, in the specialties to which the measure may be applied. It is an almost unquestioned fact that the present rate of wages in general manufacturing industries is as high as the present prices of products will stand. There are very few people accumulating fortunes from manufactures at the present time, except in specialties, where the prices can be controlled by patents, franchises or corners. Statistics show that capital invested in general manufacturing throughout the country does not earn over three and a half per cent, which is not an exorbitant price for the use of money. Hence any increase of wages without a corresponding advance of prices would be ruinous to both the employer and employed. Again, if prices should be advanced, say 15 or 20 per cent, that fact would open the doors to an almost unlimited amount of foreign products, which would proportionately advance the demand for labor, and remand the laborer back to the same position from which he is now striving to emerge.

The question of labor is too complicated a thing to be handled without due care and thought, and just here arises the need for governmental action, under which it can be placed in the hands of wise and discreet men, who should be selected with special reference to their fitness and disposition to act impartially between man and man. Here are some figures bearing upon this phase of the question, which are both interesting and instructing.

The various labor unions of New York city are estimated to comprise an aggregate membership of 130,000. The effect of adopting an eight-hour system of labor in enhancing the prices of many commodities is remarked upon by the *Chicago Tribune*, which says: "There are probably on hand in this country \$1,000,000,000 worth of manufactured goods. The average increase in values will be fully 15 or 20 per cent, corresponding to the enhanced cost of production. This will add from \$150,000,000 to \$200,000,000 to the selling value of the stocks on hand. Sugar has already felt the effect of what is coming. The strike in the great Long Island sugar refineries has put up the cost of refined sugar, at retail 2 cents and at wholesale 1½ cents per pound, or somewhere between \$160,000,000 and \$170,000,000 per annum. If the average advance is but 10 per cent, that adds from \$16,000,000 to \$17,000,000 to the bill, representing that much more profits to the manufacturers to be paid by the consumers. The great bulk of consumption is by the city wage class and the farmers, who together compose nine-tenths of the community; hence they must pay nine-tenths of the increase caused by the eight-hour system. This effect upon sugar is a fair illustration of the general effect, for, as the eight-hour limit is to be demanded in all lines of city production, this result must obtain all through."

Hours of Work in Past Years.

In the early part of this century, in English cotton factories, the week extended to 74 hours; from 1833 it was reduced to 69 hours. From this it went gradually to 60, and in 1874 to 56½ hours, which may be considered the normal working time of the week in Great Britain; altogether there are trades where 50 to 52 hours are the rule. In the United States the extent of the working day in cotton mills was 13 hours in 1840. This was gradually reduced to 11 hours, and since 1883 to 10 hours in Massachusetts, with other States beginning to move in the same direction.

A Word in Favor of Short Hours.

In speaking of the building trade and of the normal working day of eight hours in the latter part of the middle ages, Thorold Rogers says in the interest of short hours: "Employers were very likely to discover that the laborer's resistance to an excessively long day was not entirely personal, and that the work might suffer from the workman's weariness and exhaustion." The excellence of the work, lasting through ages, when more recent constructions have disappeared entirely, is even a more eloquent proof of the soundness of the economic views of our forefathers than the voices which are raised from the grave of yellow parchment. Germany, then at the head of Europe in commerce and manufacture, the economic ruler of the world, the banker and trader of Europe, held to the same rules during its high tide of prosperity, all of which shows that reasonable hours are not at all incompatible with great activity and productiveness; nay, that they are a necessary condition to their achievement.—*Millman and Mechanic*.

Gold Hill, New Mexico.

The merit of the mines of Gold Hill district are attracting the attention of men in search of mines that will pay fair dividends on investments. No property in Southern New Mexico for the amount of work done shows up better than the Standard mine of this camp, and this is by no means the only mine that pay mineral rich enough to ship can be broken on. The gold bearing leads are not only remarkably rich for gold ore, but are also perfectly free milling. The average will run about \$40 from several fair samples of ore taken and the leads vary from one to four feet in width on several claims which have been partially developed. As an illustration of what the mines will do, we will state that including the dead work performed by the three owners of the Standard mine upon that property, they have realized \$20 per day for their labor, besides storing for future working about 100 tons of \$30 ore upon the dump, which will not pay to ship, but will be treated at the camp when works are erected there. R. M. Scott, after diligent search, has at last succeeded in striking a sufficient flow of water to commence the erection of a five-stamp mill, which with his associates he has purchased and will have ponding upon the ore of the camp in a very short time. The success of Gold Hill with reduction works in the camp will be assured. The mines have merit, notwithstanding the fact that mining men have deserted them. Within six months Gold Hill will be making large and regular shipments.—*Silver City Enterprise*.

MOSQUITOES, BEARS AND MINES.—J. A. Johnson, a well-known mining man, returned from Alaska a short time since. Mr. Johnson has been examining a mine on Douglas Island, supposed to be an extension of the Alaska mine, in the interest of some French capitalists. He brought with him ore specimens, which indicate the mineral wealth of that region. "Next to the rich ore," said Mr. Johnson, "what I struck the most forcibly was the mosquitoes. Why, sir, they kill the bears. Now it seems strange that a mosquito could kill a bear, but this is the way it is done: The bears come down from the hills into the marsh land to feed on roots and berries—a sort of cranberry found there. As soon as they get comfortably to work the mosquitoes attack them and go for their eyes. The bears get up on their hind legs to fight them off and sink into the swamp. The mosquitoes, which are of a most extraordinary size, keep at them until they are totally blind, and then they have them completely at their mercy. I have seen over a dozen bear carcasses in those swamps positively killed by the mosquitoes."

SHIPPING ORE TOO FAR.—Capt. Cooney was in the city this week. Having closed down upon some of his mines for the simple reason that the enormous cost of transportation to the works at Denver, Colorado, netted him nothing above expenses, the captain started in treating the tailings of the old mill. The parties with whom he contracted receive one-half, and furnish the requisite horse-power. The pulp ran through a 40-mesh screen, but owing to the heavy, silicious character of the quartz, carried some of the sulphurets and the fine gold down with it. A revolving 30-mesh screen remedied this defect, the fine tailings sticking to the belt. Capt. Cooney says he will never ship as far as Denver, and wants reduction works established in this city or in the Mogollons.—*Silver City Enterprise*.

THE May Lundy mine, at Mill Creek, Mono county, California, is said to have passed into the hands of a syndicate of English capitalists.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MIDDLE BAR.—*Ledger*, May 29: W. A. Nevills, of the big tunnel, has determined to erect a Tustin mill at the mouth of the tunnel for the purpose of treating the rich ores of this district. It has been found by experience that the ordinary mill process is a complete failure in saving the gold contained in this rebellious ore. It is said, on good authority, that the tailings scattered along the gulch from the Mammoth mill to the river assay about \$10 per ton. From this it is evident that a different method of treatment is absolutely necessary. The Tustin mill works on the principle of Cornish rollers, and it is claimed by those acquainted with it that it is adapted to such ores as are met with at the Bar. After the rock is reduced to pulp, the whole of it will be roasted. To this end, Mr. Nevills has also determined to erect large sulphurets works near the tunnel, to have a capacity of treating five tons per day. A brick kiln is to be started near the Moore mine immediately for this work.

MISCELLANEOUS.—The New London, near Plymouth, continues to develop splendidly. The ledge is said to be from six to eight feet wide, and a portion of it containing considerable free gold. At the Kennedy the shaft has been deepened nearly 40 feet since sinking was commenced. They are also running a drift at the 600 foot level. The J. H. Hill gravel mine at Oletha has made a partial cleanup of \$1000. This mine has lain idle for a number of years on account of a lack of enterprise.

Mariposa.

COULTERVILLE.—*Gazette-Herald*, May 29: The Red Cloud mine is still grinding quartz, and report says they have a good mine and are doing well. The Bandercita mine is still operating about as usual. The last heard was that a shaft was being sunk from the lower level.

Nevada.

TO STOP DRIFTING.—*Nevada Co. Transcript*, May 27: We regret very much to learn from the office of the North Bloomfield and Milton Companies, in San Francisco, that orders have been given to the superintendents of both companies to stop all drifting work and discharge all their miners, in compliance with Judge Sawyer's recent decree, in the contempt case, wherein drifting was the only contempt committed. He so plainly stated that he would not allow any material from any mine or mining ground to be placed in any stream, under penalty of a fine of the value of all that might be taken out, that it seems impossible to continue mining in any way at present. The president of the North Bloomfield Company says that his company will, he thinks, try further experiments by the elevator process, in the hope that something may yet be done satisfactory to the judge. But as matters stand now, drifting is under the ban and a crime. Quartz may come next, and yet with these facts staring us in the face, our people send delegates to an irrigation convention and take no notice whatever of the eminent peril of our mining interests.

THE CROWN POINT MINE.—*Grass Valley Union*, May 26: The reported sale of the Crown Point, the Union learns, is upon the following terms: The intending purchaser, Mr. Nichols, has the privilege of working the mine one month, and crush the ore at such mills as he may choose, the profits for that time to go to the owner, Mr. Gauthier. If the result of the month's working is satisfactory to Mr. Nichols, he will then take the property at the price of \$300,000. A forfeit has been put up, but the amount is not stated.

MINE LEASED.—The Pennsylvania Consolidated has been leased to a company of eight working miners, who commenced operations on Monday by starting up the pumps to relieve the mine of water. There are two levels opened in the mine—one to the depth of 175 feet and the other at 275 feet. But little drifting has been done on the lower level. The first work that will be done will be to raise an air shaft between the two levels. The ledge in the mine is from six inches to two feet in thickness. The rock heretofore taken out has been of good quality, and specimen rock showing well in heavy gold and fine sulphurets has been produced. The mine only needs regular development to be a valuable property. The lessees are Chas. P. Whiting, W. A. Roland, H. H. Smith, Wm. Rumsey, Peter Cadden, Lee Hyatt, —Bastian, and one other whose name was not learned.

BADGER MINE.—The machinery of the Badger mine, driven by water-power, is working smoothly, and to all appearance the shaft, which is 180 feet in depth, will be pumped out and cleaned of any accumulation of debris in ten days. As far as exposed, the timbers of the shaft below the water line are in perfect condition.

QUARTZ FROM THE COE MINE.—*Grass Valley Union*, May 30: A cleanup of seven loads of quartz from the Coe mine (taken out by tributaries) was made at Frank Chesneau's little mill on Friday, which gave a yield of 10 ounces and \$6 of retorted gold, or an aggregate of \$171. This was equal to \$24.43 per load. The rock was not the best that is now coming out of the mine, as a crushing of a much better quality of quartz is now being made at Roger's mill, and it is believed will go \$50 per load. The above is the last crushing of quartz that will be made at Chesneau's mill for the present, as owing to the diversion of the Idaho water to the Crown Point and Badger mines, Wolf creek does not afford sufficient water to run his mill. Steam power will have to be applied to the mill, or some arrangements made to obtain water. The results of the custom work done at this mill are always of the most satisfactory character, as Mr. Chesneau is a very capable millman, having had many years experience in the business.

CREAK MINING.—*Tidings*, May 29: Allen W. Deadman, who has been for a long time on the police force in San Francisco, will soon start an extensive ground-sluicing business in the vicinity of his brother's ranch on Wolf creek, in the Cottage Hill district, 12 miles south of Grass Valley. The bed of the creek is known to be very rich in that vi-

cinity, and since Mr. Deadman had his hand hurt in the performance of his police duties, he has determined to try his fortune in mining. Several San Francisco gentlemen are interested with him. About 40 men will be employed in working the bed of the creek.

Placer.

IOWA HILL.—*Placer Co. Republican*, May 26: C. F. Hoffmann and Ross E. Brown, superintending engineers for the French syndicate, passed through town last week on their way to Damascus district to locate a position for the Burleigh drilling machinery, and to commence work on the big tunnel which is to open up their recent large purchases in that district. A large number of men will be employed, and Damascus and Indian springs will soon be lively camps. The Morning Star Company are running a 500-foot tunnel to work the rich ground they discovered some weeks since. J. B. Hobson has been awarded the contract and has employed George West, of Forest Hill, as foreman.

WASHINGTON.—The pumps have all been taken out of the Washington mine at Forest Hill, and work has been abandoned. Eleven men are working at the Live Oak. They have struck a body of gravel five feet thick, which prospects very well, and they are putting it in the dump pile.

Plumas.

GRANITE BASIN.—*Cor. Plumas National*, May 26: Mr. Johnson is running his mill on rock that would astonish the oldest miner on the coast for its richness. Mr. Graves is the busy man of the Basin. He is driving his tunnel on the Flower Pot, in good milling rock. Swan and Freethy are getting along well with their big contract of taking out quartz on the Siebert.

Shasta.

PLACER AND QUARTZ.—*Shasta Co. Democrat*, May 26: The Reid mill will soon commence crushing rock for Forbes & Co. Ollie Whitton is prospecting one of his mining claims on Squaw creek. An iron ore car is at the depot for the Golden Chariot mine, near Shasta. The Schaffer mine, situated on the east side of the river, opposite Middle creek, is panning out huge. Another rich pocket was struck last week. Within the past two weeks several fine gold quartz prospects were discovered on the west side of Squaw creek in Flat creek mining district. Blue gravel and cement diggings have lately been discovered between Reid's ferry and Quartz Hill. A streak six feet wide prospects ten cents to the pan. Frank Davis is sinking a shaft on the Clipper mine, on Squaw creek, and is taking out richer ore than ever. The vein is solid four feet in width. The P. M. Mining Co. of Squaw creek have ordered another Huntington quartz mill. The mill is on the way and will be running in 60 days. The Muchmore brothers are developing a fine mining property near Lower springs. The vein is six feet wide and is yielding very rich rock. During the winter months while water was plenty they run an arastra with good results. The boys intend to put up a stamp mill next fall. We stated last week that Tom Green's mill would be crushing ore soon. We have since learned that he is having trouble with the foundry where the machinery was purchased, which will delay the completion of the mill. The foundrymen failed to supply all the machinery according to contract.

UNCLE SAM MINE.—*Free Press*, May 29: Jack Conant returned from San Francisco last week, having ordered a ten-stamp quartz mill and a saw mill for the Uncle Sam mine on Squaw creek, owned by W. R. Conant, for whom Jack Conant is attorney. It is expected that these mills will be set up and ready for business by August 1st. The latest developments on the Uncle Sam are very flattering. A tunnel 230 feet long shows a ledge seven feet wide at a depth of 330 feet from the surface of the ground. The last assay shows \$602.71 in gold and \$9.48 in silver, giving a total of \$612.19 to the ton. As there is at least a thousand tons in sight, a stamp mill will be kept pretty busy from the start. Jack further informs us that the Matthews & Co. location, purchased from him some time since, is turning out well, their Huntington mill doing finely.

Sierra.

ALLEGHANY.—*Mountain Messenger*, May 22: Wm. Angove and others have leased the Rainbow ledge, at the old stope, and are developing there. The Buckeye Co., Alleghany, are breasting, and the gravel prospects well. T. H. Smith has two men employed taking out quartz from his ledge, very rich in gold. He has run in three tunnels on the ledge, and is clearing away a site for one of Forbes' mills down on the creek, above which he will put in a dam for the water-power. Specimen rock, glittering and ribboned with gold, has been extracted, and this mine is one of the most promising in Sierra.

Sliskiyou.

FORT JONES NOTES.—*Yreka Union*, May 26: Chas. Walker & Co. have recently made a rich strike in quartz on Indian creek, nearly opposite Geo. Baker's residence. Last Friday they pounded out \$20 from decomposed quartz. They have found a number of pieces ranging from \$5 to \$10. Some German boys from the lower country have found a ledge at the extreme head of New York gulch, which prospects well. The Crocker boys, on Deadwood, at the mouth of East Fork, are running their large arastra on good rock; they have a very favorable location to work. The ledge is large; one man can mine sufficient rock to keep the arastra running; as they have splendid water-power they can make good wages out of five-dollar quartz. Schroder & Werner's machinery is now on the way. A large force is engaged building the mill, boarding-house, etc. A number of teams are engaged in hauling the lumber. This is unquestionably the richest find that has ever been uncovered in Northern California. It will not be long until they will be molding and shipping gold bars the size of bricks. The hydraulic mines in this section are having a prosperous season. The Eastlick Bros., Wright & Fletcher, Campbell and others are literally making the dirt bowl. The new elevator, invented by the Eastlicks, is now being patented; and is a perfect success. It is the admiration of all the old miners, and reflects great credit upon these gentlemen, who perfected it under adverse criticisms and numerous obstacles that came in their way.

Trinity.

NEW QUARTZ DISCOVERY.—*Trinity Journal*, May 29: Mr. Jonathan Smith was in town this week and from him we have information concerning his recent quartz discovery on Indian Creek in this

county. The ledge is located about two miles above the town; when first discovered it was only an inch in width; he has sunk 14 feet and it is now from 8 to 10 inches wide. One ton was crushed in a hand arastra and yielded \$105. Two pieces of the rock which Mr. Smith kindly gave us as cabinet specimens show much free gold. Another ledge which he discovered in the same neighborhood also promises well, 1000 lbs yielding about \$20. There is a large scope of country lying between Indian Creek and Bullychoop which should receive attention from quartz prospectors.

NEVADA.

Washoe District.

HALE AND NORCROSS.—*Virginia Enterprise*, May 24: The drift south from the bottom of the deep winze on the 3200 level is now 67 feet in length, running in a due southerly direction toward the Combination shaft, which has reached that level. The drift is skirting along the east wall of the ore vein, and no crosscutting will be done before the connection is made. Owing to the necessary drainage grade a little downward toward the shaft, and the having to pass the debris excavated backward through the drift, upward through the winze and out through the 3100 level, the progress in this drift is necessarily slower than it would otherwise be. This, however, will be changed very materially when a connection is made at the other end, from the Combination shaft. On the 2900 level, the north and west workings toward Savage south line show no improvement from last week. Streaks and bunches of fine ore continue to be met with, but they do not concentrate as yet into the expected and long-looked-for bonanza. The prospects, however, are exceedingly favorable at that point, as well as in the explorations above the 3100 level.

CHOLLAR.—Rattling good progress, so to speak, has been made in sinking the Combination shaft, about 24 feet per week being the rate, and to-day the 3200 level is reached. This has been the objective point, making it the deepest vertical mining shaft in the known world. It will be continued 60 feet deeper for a sump or well for the big pumps, and further sinking discontinued until the present lowest levels are satisfactorily explored. No increase of water is met with in this deeper sinking, although the bottom of the shaft is now in the main Comstock ore channel, having passed through the east or hanging wall on the regular dip or inclination of the lode to the east. A large amount of quartz is met with, showing more and stronger mineralization, and it is by no means impossible to run into good ore before the bottom of the sump is reached.

GOULD AND CURRY.—On the 600 level the upraise at the south line, next the Savage, has been extended 38 feet, making a total upwardness above the track floor of the 600 level of 141 feet. It still continues in a strongly mineralized quartz formation, which bids fair to develop good pay ore before the 400 level is reached. The east and west crosscuts from this upraise show no material difference from last week, being in quartz giving low assays.

CON. CALIFORNIA AND VIRGINIA.—About 420 tons is now the regular daily yield, giving an average assay from the mill battery samples of about \$14 per ton. Reopening the old stopes penetrated by the southwest drift on the 1400 level progresses favorably, and on the 1600 level west crosscut No. 2 has connected with the old north drift, giving good air circulation and other material advantages.

ALTA.—About 50 feet still remain to drift in order to connect with the old Lady Washington workings on the 700 level. Until the connection is made no crosscutting will be done into the ore vein, which lies to the west. A connection for a good air circulation is the main object at present.

BEST AND BELCHER.—The reduction of the water in the bottom of the Osobiston shaft progresses slowly, by reason of the great area of ground to be drained. The water is being steadily reduced, however, and will be all out in due time.

SAVAGE.—The main lateral drift south on the 600 level from the Gould & Curry was extended 46 feet, making a total length of 116 feet, driving directly for connection with the main shaft of the mine. It continues in strongly mineralized quartz, vein porphyry and clay.

POTOSI.—Some delay was met with in the diamond drill arrangements on the 3100 level, and trouble from the broken, seamy, clayey formation met with, consequently there is nothing new or favorable to report this week.

MONTE CRISTO.—All work still concentrated in advancing the drift west on the 150 level from the new shaft. The rock seems to be getting a little softer, indicating near approach to the ore vein.

OPHIR.—On the 700 level the main exploration drifts north and south are making usual progress, both running in favorable looking vein matter—porphyry, clay and quartz.

SIERRA NEVADA.—On the 520 level, west crosscut No. 2 was extended 36 feet in the same hard quartzite and porphyry formation, with a little seepage of water. Total length, 577 feet.

YELLOW JACKET.—Daily yield, 140 tons, keeping the Brunswick mill steadily supplied. The old workings above the 1300 level continue looking and yielding well.

CROWN POINT AND BELCHER.—Daily yield 375 tons from the old workings, all the way from the 1700 level upward. No new feature of interest to report.

KENTUCK.—About 60 tons of ore per day continue to be yielded from the old upper workings—all low-grade ore.

Bernice District.

LOVELOCK.—*Cor. Silver State*, May 29: The Bernice mill has been running steadily on ores from various mines in that district for a week past, and has produced about \$12,000 in bullion. G. W. Bothwell, owner and manager of the mill, is building a residence and store at Bernice, and seems to be fully satisfied that the camp will be prosperous and permanent. About a carload of merchandise is now at the depot at this place, awaiting the completion of the new store, which will be opened shortly and be a great convenience to the miners. Our mines seem to be taking a new start all around. The nickel mines, which were under a cloud for awhile, have paid up the hands, and will shortly resume operations. Uncle George Lovelock returned from the city last week to start things going.

Central District.

LOCOMOTIVE.—*Eureka Sentinel*, May 28: The Locomotive mine, in Central district, Humboldt county, owned by J. F. Clark, is said to yield ore milling 322 ounces in silver per ton. The ore is refractory and is shipped to Salt Lake for reduction.

Columbus District.

HOLMES.—*Candelaria True Fissure*, May 29: In the eastern end of the eighth level we are extending the level east. It is in good-looking ground, with a small streak of good ore in the face of the drift. Over the point where we made the connection between the eighth and top of ninth raise, we have a good stope of ore. The ore is high grade, and the stope is producing well. In the raise 100 feet west of the ninth raise we have discontinued crosscutting for the present. Opposite the ninth raise, ninth level, we are crosscutting toward the hanging wall. In the crosscut we struck a small streak of good ore. This ground looks exceedingly favorable. We have good prospects in East Thomas. When this connection is made it will ventilate the whole eastern portion of the mine. The stope 60 feet east of last turntable, first shaft level, looks exceedingly well. This has been a splendid stope. It has produced well ever since a year ago last November, and looks just as well now as it ever has. The stope 50 feet below the first shaft level, and directly under the last-mentioned ore body, is still producing well. At point six we are getting some good ore. In the intermediate level between the first and second shaft levels we have a good prospect, from which we are extracting some ore. Sixty feet west of Cross development we are getting some good ore. The Creer stope has improved since last report. The intermediate stope between the fourth and fifth levels is giving considerable \$60 ore. A small amount of ore of fair grade is being taken from the west drift on the fourth level. The intermediate stope between the third and fourth levels, east of the shaft, is giving some \$60 from a bunch that looks promising. The stopes above the west drift on the third level are giving a little ore of fair grade. The east stope on the second level is looking much the same and is turning out considerable \$60 ore. The intermediate stopes between the first and second levels are yielding the usual amount of ore. Bullion shipment, May 26th, \$10,168.63.

Ellsworth District.

QUIET.—*Belmont Courier*, May 22: Ellsworth is very quiet. No mining enterprise of any kind is being conducted there.

Esmeralda District.

AURORA'S PROSPECTS.—*Virginia Enterprise*, May 27: Colonel A. C. May, writing to a Comstock friend, says: Aurora, Esmeralda county, has a bright future. "The new English company, 'The Consolidated Esmeralda, limited,' is pushing work in a comprehensive manner. Its central point of operation is ex-Governor Bladell's old pet mine, the Humboldt West, where a shaft has been sunk more than 300 feet and four levels run. Sinking is still being prosecuted diligently. At present depth the vein is upward of 45 feet in width, the ore being of good grade, mostly gold-bearing. About 80 men are employed. There are steam hoisting works and everything complete to prospect the mine to a depth of 1200 feet. The mill at Del Monte is kept running steadily, and yields enough to pay all expenses, so that stockholders in the old country are not being cinched for assessments. It is the intention to build a 50-stamp mill at the mine and 100-stamps on Walker river. There is sufficient ore in sight now to keep the two contemplated mills and the Del Monte mill closely at work for ten years, and pay handsome dividends. Our British brethren who have invested their money in Nevada mines feel much elated over the prospect, for Aurora's outlook is certainly bright. She sent out upward of \$14,000,000 in bullion inside of four years, and it is not a fair supposition that the surface scratchers got it all.

THE DICTATOR.—*Walker Lake Bulletin*, May 27: The Dictator shaft is now down 100 feet, at which depth the ledge is from 15 to 20 feet wide. A cross-cut will be started immediately to ascertain the exact dimensions, when drifts will be run each way on the ledge. Quite a number of prominent mining men visited the mine a few days ago, among them being Gov. Kinkead, H. M. Yerrington, R. P. Keating, Dr. Bronson and Robt. Pixley, all of whom expressed themselves as being very highly pleased with present developments and the prospects for a rich and permanent mine. Supt. Keating, of the Hale & Norcross, took quite a number of samples and had them assayed. One went over \$800 in gold, another, \$487 in gold and \$5 in silver, and the average at the bottom of the shaft, \$75.35 in gold, being on top of the ledge on an incline. Should the cross-cut show up in proportion, it will prove the largest mine in this part of the country.

Jefferson District.

GOOD ORE.—*Belmont Courier*, May 22: The Jefferson chlorides are taking out good ore.

Pennsylvania District.

MORE STAMPS.—*Pioche Record*, May 22: During the week 4500 ounces of bullion was brought from Pennsylvania district by G. R. Barton. They will place five additional stamps in the mill as soon as possible. At present the crushing capacity at the mill is but six tons daily.

San Antonio District.

CHLORIDING.—*Belmont Courier*, May 22: It is thought that some chloriding will be done in the mines of San Antonio soon.

Reveille Creek District.

THE OHIO.—*Silver State*, May 26: Yesterday J. J. O'Toole, N. Treweek and J. M. Porter, of Salt Lake City, and Prof. Foster, of Colorado, returned from the Ohio mine at Rebel creek, whither they went last week to examine the property. Mr. Treweek, who is an experienced mining man, informed a *Silver State* reporter that he considers the mine a very fine property. The mine is opened by a tunnel to a depth of nearly 400 feet by actual survey on the dip of the vein, and it can be worked by tunnel 400 feet deeper. The ledge is from two to 40 feet wide, and there is now some 15,000 tons of ore on the dump, and at least three times as much in sight in the drifts. The ore averages 42 ounces of silver and \$7 in gold to the ton. It is almost wholly free from base metal, and can be worked to a high percentage of its assay value by the ordinary wet process. The owners will probably build a

mill on the mine in the near future, though they have not yet determined upon the time, or the capacity of the mill. Much of the ore has been shipped to Salt Lake, but as the expense of hauling it by teams to this place and shipping it hence by rail is necessarily great, only the highest grade of ore will bear it.

ARIZONA.

CHLORIDERS DOING WELL.—Cor. Prescott *Courier*, May 28: Nothing much of any note to chronicle this week from Turkey creek. McLain made a shipment of ore last week and a rich strike in the Longfellow mine this week. So we may class him among the lucky ones. The ore shipped by Randolph & Ryan netted them over \$600 per ton. They will make another shipment next week. Roach is delving away on the June Bug, which is looking fine.

PECK.—Harry Norton, who has leased the Silver Prince, is doing very well. He is drifting on high grade ore and is well pleased with the prospect. "Blanco" White made a rich find last week in Crazy Basin, two miles east of the Peck claim. The ore is rich in horn silver. Major McKenney made a rich strike in one of his mines in the Peck district. The McKinnor Bros. have a fine showing in the War Eagle. The ore body is large and of very good grade. They have a very fine lot of high grade ore on the dump. Tom Goodwin will start his arastra, in a few days, on ore from his mine in Bradshaw Basin. The claim is a recent discovery. He has five tons of rich gold ore to start on.

WALNUT GROVE.—John Mahoney has been running the Callen mill, with good success, on ore from his gold mines, Constellation and Rose. A very rich strike was made last week in the Rose south of the old working shaft. The ore strata is 15 inches wide, and will mill fifty dollars per ton. Years ago, old experienced miners predicted that the Rose would at some future time be classed among the best paying gold mines in the county. Present developments would seem to verify the prediction. Morrow & Robbins are arastrating on a claim bearing their name, and are doing very well. The mine is situated near the old Hæcher mill-site, and is a very good prospect. Taking all in all, the mining outlook was never brighter in Yavapai county. True, there are very few big companies operating; but there are men who have made success a certainty, where big companies have made a failure. The chloriders are busy at work in the different camps of the county, and where the chloriders are developing the outlook is always bright.

COLORADO.

LITTLE ALICE.—Georgetown *Courier*, May 29: Mr. Slater, superintendent of the Little Alice Mining Company, whose property is situated on Fall river, contemplates soon commencing active operations in the way of sluicing on the placer claims of the company. The company will probably put up a stamp mill this season, when the property will be more thoroughly explored. An enterprise in the shape of a tunnel is now under way at the base of Griffith mountain. It is started to explore the Nancy Smith and other lodes. A fine vein of high-grade ore has been exposed in the Richmond lode, Saxon mountain. Clark & Co., lessees on the Wolverine lode, are sinking from the adit level, and at 40 feet have two inches of solid ore, carrying particles of native silver. It is reported that a sale of the Little Giant lode, on Red Elephant mountain, is in contemplation. Several leases on the Mendota are showing up splendidly. Morrell & Co., who are leasing on the Victoria tunnel, level west, have opened up ground for 250 feet, and during the whole of this distance heavy lead ore is exposed from six inches to two feet in thickness. They will make another shipment of 35 tons next week. Peterson & Co., lessees on the upper workings, are operating upon a large and continuous body of galena, and expect to output at least 30 tons this month. It is stated that Joe Podvin, who is working the Muldoon lode, on McClellan mountain, has opened a vein of ore four inches in thickness, which, according to a test recently made, returned 600 ounces silver per ton. Work will soon be commenced on the R. E. Lee lode, at the head of Beaver Creek. Both the shaft and adit show a large vein of mineralized quartz. In early days some good ore was taken from these workings. Ten men are at present engaged on the Two Sisters mine, and we understand that the company owning the property will work it very extensively in the future. It promises to be one of the leading mines of Silver creek ere long.

IDAHO.

THE SMELTERS WILL START UP.—Ketchum *Keystone*, May 22: Supt. J. H. Hardess, of the P. M. & S. Co., returned home from Omaha yesterday, having left Messrs. Wright and Borie, of his company, at Granger, en route to San Francisco. We understand that Mr. Hardess comes with the gratifying news that the works at this place will be blown in for a summer's run in one week. We understand this is owing to the consummation of suitable arrangements at Omaha, whereby the P. M. & S. Co. can afford to pay competing prices for the ores of the district. This will be a welcome word to the miners of this section and the best of news for the citizens of Ketchum. There is no truth in the report that the smelters were sold to the Omaha Works. They have sufficient ore, flux and fuel on hand for a considerable run, and will start up with the determination to compete for a continuous supply from the mines of Wood River.

THE NYE PUMP ENTERPRISE.—Coeur D'Alene *Record*, May 28: The big gravel pump on the Nugget Fraction claim will soon be working to its full est capacity. The sluice-boxes, elevated about ten feet above the ground in order to give sufficient fall for washing and abundant room for dumping purposes, are nearly all in place and will soon be in use. The gravel prospects well 25 feet below the surface, indicating that there must be at least 15 feet of "pay dirt." The fuel is reported poor, too poor for the two boilers now set up to furnish sufficient power. With first-class fuel they would be equal to 100-horse power. Larger ones are expected in a few days, and when they arrive that difficulty will vanish. Supt. Cargill says "the enterprise has been thoroughly tested in other places. It is no experiment. The company know what they are doing."

WESP GULCH.—Late Tuesday afternoon the reporter rode up the Littlefield road to Wesp Gulch to ascertain what is being done there by John Comerlihl, who, about six weeks ago, bought claim No. 1 from Lorenzo Aramburo, and a few days later began putting in a bedrock flume. A little more than a year ago there were as many as 16 different owners in the claim. It changed hands several times, Nathaniel Vestal being at one time a partner. He and others sold out to several Georgians, who began work about 200 feet up the gulch from the road by sinking a shaft and running a drain. They sunk the shaft only 17 feet and did not reach bedrock, but they found gold enough in the gravel to encourage them to go below and run a tunnel up what they believed to be the deep channel of the gulch. They began on the Butte claim and ran a tunnel and drain-race up under the road and a short distance up the gulch, but not far enough to test its value. They sunk four shafts, one just below the road, striking bedrock at a depth of 22 feet. Mr. Comerlihl began work five weeks ago, and first built a reservoir across the gulch about 500 feet from its mouth. He then began putting in his bedrock flume, which is completed a distance of 225 feet, and is believed to be within 25 feet of bedrock. The upper boxes are about 14 feet below the surface. The gravel prospects fairly, and there is good reason to believe that the bedrock flume enterprise will be a paying one. The gulch is nearly as large as Alder, but not so wide, and hence does not include so much placer ground. It will average about 60 feet wide for a distance of one-fifth of a mile. Above that it is much narrower. One hundred and fifty feet above the reservoir is the California ditch. On a bar just above the ditch fair pay has been obtained with a rocker for several months past. Wesp gulch cuts the old wash squarely, and over in Cougar gulch, which heads between Wesp and Gold Run, the old wash is quite unbroken and is very similar to that shown up by the operations on the Badger claim, near the head of Nugget gulch between Alder and Buckskin. From his reservoir Mr. Comerlihl has built a 10-inch flume 250 feet along the hillside, giving him 70 feet fall for his hydraulic. The gulch supplies plenty of water to work three months of the year without using the reservoir. By the aid of that the season of work may be considerably prolonged. Three men are now employed.

SILVER MOUNTAIN.—Idaho *Statesman*, May 27: Patsy Marley came in from Silver Mountain day before yesterday. He left here about the 20th of April and stopped several days in Idaho City and two days in Banner. The distance from Banner he calls 18 miles. Mat Graham's company got out of provisions and powder, and had to go to Atlanta and pack it in on their backs. Mat is there and makes a hand. Four other men are there at work and have been all winter, and worked two shifts, night and day, in their tunnel. They have run 200 feet in the hardest kind of rock, and have 40 more to run before striking the lead, and will then be 200 feet from the surface. Will Austin and Wm. Irwin own the Snowbird, about two miles from Graham's lead. The Snowbird and Big Croppings join together, or rather is the same lead. The latter is owned by Patsy Marley. Irwin sent a man out with Austin about six weeks ago, and they are at work running a tunnel across the lead. They are in 30 feet and will have to run 50 feet more to cross the lead and strike the best paying streak. The rock they have run through will pay about \$50 per ton on an average. Marley's lead will be very well developed by the completion of the Austin and Irwin tunnel. It will be the 15th of June before pack animals can reach the camp.

MONTANA.

RESUMPTION OF OPERATIONS.—*Inter Mountain*, May 25: The Cora mine, owned by Roudeshush & Young, is 115 feet deep. The lower level exposes a well-defined and regular vein of silver-copper ore from five to 12 feet wide, much of it being good smelting ore, and some of it requiring concentration. It is an old and well-known property, and is regarded as one of the coming mines of the camp. It has not been actively and continuously worked since about 1833, and the resumption of permanent operations will be watched with considerable interest. The shaft will be at once sunk to the 315-foot level. Another property which has been idle for some time is the Grey Rock, owned by Judge Davis, and which in years past has produced, from a very extensive vein, thousands of tons of fine milling ore from above the water line. Three years ago a three-compartment shaft was sunk by John Downs at a point some distance south of the outcrop, and from the bottom, at a depth of 300 feet, cross-cuts were extended north. The ore was base, having turned chiefly into copper pyrites, and work was not prolonged. Copper mines are valuable now, however, and it has been determined to resume development. The main shaft will be at once dropped to the 400-foot station, and explorations from that point will be active and continuous. The Grey Rock is supposed to be an extension either of the Bell or High Ore lode, and is justly regarded as one of the most extensive properties of the district.

THE PYRENEES.—*Inter Mountain*, May 28th: From Mr. J. Ross Clark, who returned a day or two ago from a trip to the Pyrenees mine near Cable, it is learned that satisfactory progress is being made in developing the property, and that the output is fully up to their expectations. Mr. Cameron, the principal owner formerly, had tapped the vein by a tunnel at a depth of a little over 100 feet. At this depth he had run levels both ways, opening the pay chute for a distance of about 800 feet along the vein. The ore body is from three to seven feet wide. He had staked out the most of the best ore above this level and worked it in a five-stamp mill. The company is now sinking a shaft so as to open the vein almost beneath the point where Cameron tapped it and at a total depth of 200 feet. Some 60 or 70 feet of the sinking is already done, and they are getting down at the rate of a set of timbers—five feet—every 36 hours. Thus it will take them till about the middle of July to complete the shaft. From its bottom the vein will be crosscut and levels run in a manner similar to those in the workings above. If the body of pay ore is as extensive below as it is in Cameron's levels the company will have one of the finest gold properties in the Northwest. While the work is being done the company will continue to take out ore from the 100-foot level and work it in their new 10-stamp mill, which has now been in

operation for about 30 days. Cameron's old five-stamp mill was entirely displaced, and the only part of the machinery which the company is using is the engine and boiler. They are not picking the ore as Cameron did, but are putting everything through the mill with an average saving of about \$10 per ton. The average of the pay chute is, however, much above this figure, but they are treating a good deal of ore which Cameron had for the time being laid aside on account of its low grade. No cleanup has as yet been made from the new mill. Five vanners, four in number, are now being added to the plant, and the accumulated tailings of several years past from Cameron's mill—there being several hundred tons—will be worked over. Assays show that these tailings still contain \$20 per ton in gold.

NEW MEXICO.

BESY.—Silver City *Enterprise*, May 28: There are a number of miners busy at Lone Mountain and ore is being produced regularly. It is said that Geo. O. Smith contemplates the erection of a smelter at Georgetown. Capt. Stewart, who shipped a carload of ore from the Peartless to the Denning sampler last week, was greatly dissatisfied with the result. He will ship to Socorro in the future. Active work has been done upon the lead properties near Central City, by Hutchinson and Walker. Five carloads of ore have been shipped so far this month, and as much more is now on the dumps. It ranges in value from 6 to 20 ounces in silver and from 40 to 60 per cent in lead. A private letter from John A. Miller, received Tuesday last, says: "My last shipment of 12 tons went at the rate of 230 ounces in silver, one ounce in gold and 30 per cent in copper." Three men are at work upon the Sally, a new strike of considerable importance recently made in the Burro mountains. The ore is silver glance, some of which is very rich. J. B. Malone, who has a lease on the Tenderfoot mine at Malone, is now taking out on an average one carload of ore per month, which nets him about \$1000. Mr. Malone is working but four men, and does not ship anything under 60-ounce rock. A representative of the *Enterprise*, accompanied by E. H. Kinney, superintendent of Emma and Hidden Treasure mines, went through those mines yesterday, and was surprised to find so large a quantity of ore in the different workings. These mines are owned by J. H. Flagler and other New York capitalists, who have turned their interests over to the gentleman above named to operate as his judgment dictates. Since he ordered work commenced upon them about one month ago the force has been increased until it numbers 27 men, and the pay ore exposures are innumerable. The claims adjoin the famous Brennen '76 mine, which is noted as the greatest producing mine in southern New Mexico, and the mineral is found in the same character of quartz and slate in line; some of the ore chambers being remarkably rich and large. Mr. Kinney, after many experiment tests of the decomposed lime found near the ore chutes, finds that it assays about \$20 per ton. This ore has heretofore been cast aside as waste, but hereafter it will be carefully stored away for treatment at the company's mill.

OREGON.

PINE CREEK.—Cor. *Bedrock Democrat*, May 24: Cornucopia is experiencing a slight boom at present; building is going on at a brisk rate. Snow has almost entirely disappeared, so that the prospector can wend his way out over the hills in search of the precious metal. Within the last few days there have been some good locations made on what is called the Simmonds mountain. The Simmonds mine is now being worked; a force of ten men is employed. The ledge is very rich in galena ore. The Whitman mine is now down 160 feet. A large size winze has just been placed in position. The extension of the Whitman, the Alta, is to be sunk 250 feet, the contract being let out to Messrs. Lindgreen and O'Malley. James Maloney's ledge, the O. R. & N., has been in dispute in the Justice's Court, other parties laying claim to the same. It is undoubtedly a rich ledge; 14 ounces of gold were recently pounded out in a hand mortar. The Dominion, Burdette & Co., is now tunneled to a depth of 140 feet, a contract having been let to H. Kern & Co. to tunnel 150 feet deeper. The ledge assays very rich in silver. A two-stamp quartz mill has been put in operation by Portland parties. If the enterprise succeeds the company will soon put in a large mill. The O. G. M. Co. have put men to work clearing off a mill site, one-fourth mile above town. A saw-mill will also be erected on the same by the company.

PLACER AND QUARTZ.—Jacksonville *Times*, May 28: Considerable work is going on in the Goddard Hill district. Prospecting continues in many places, and some excellent discoveries are reported. D. King & Co. have struck excellent drifting diggings on Jackson creek, which are said to pay \$4 per hand daily. The McDford Reduction Works are making a run on ore from the New Discovery mine, which promises well. Bedrock was struck in the Sterling mine a short time since, and everything is progressing satisfactorily there. L. D. Brown has put a quartz mill in the vicinity of Swinden & Co.'s ledge in Rock Point precinct, which will soon be running in good style. Jas. Herd's quartz mill has been moved to the head of Jackson creek, where it is engaged in crushing cement for Blalock, Owings & Co., with excellent results. S. McConnell has sold his placer diggings on Wagner creek to Capt. Thos. Smith and Geo. H. Lynch for \$1100. The purchasers secured a bargain in our estimation. The Hydraulic mines of Jackson and Josephine counties are still running, and have enough water for present purposes, though the supply will commence to fail before long. Messrs. Klippel, Howard and Keaton are engaged in cutting a ditch of considerable length to their mines on Applegate, from which they expect excellent returns in the future. Sampson McConnell has been doing very well at his placer diggings on Wagner creek. He found a fine nugget of gold worth \$281 a few days since, and has taken out several hundred dollars worth of coarse gold besides this season. The quartz mill on Wagner creek will soon be in running order. It is a large and first-class one and is expected to work wonders in that mining camp.

Ione District.

GOOD ORE.—Belmont *Courier*, May 22: From John H. Becker we learn that a very fine streak of ore has been struck in the Indianapolis mine, near Ione. This mine is being worked under the direc-

tion of R. C. Langworthy, and has in the days gone by produced large quantities of high-grade ore. It is now being thoroughly prospected and opened, and as soon as the developments warrant, reduction works will be erected for the treatment of the ores.

Ophir District.

MEN ENOUGH.—Belmont *Courier*, May 22: The Chicago Mining and Reduction Company are employing about all the men that can be conveniently worked at present. We would advise miners not to rush in there too fast, as there is not work for every one that comes along. The capacity of the mill is being increased and other improvements made. Ophir is a live and prosperous camp, but it is not large enough to supply work for all the unemployed in the State of Nevada.

Reveille District.

GLA MILL.—Belmont *Courier*, May 22: The Gila mill, at Reveille, will soon drop stamps on ore from the company's mine. Reveille will be a lively little camp this summer.

Spanish Belt District.

BARCELONA.—Belmont *Courier*, May 22: Mike Hearon returned from Spanish Belt on Sunday. He has a very high opinion of the Barcelona mine, and is satisfied that as soon as it is properly worked it will prove one of the most productive properties in the State. The Belt, he says, has never been properly prospected for the rich mineral deposits that are there hidden, awaiting enterprise to discover and develop them.

Union District.

EXAMINING MINES.—Belmont *Courier*, May 22: Some San Francisco mining experts visited Union district last week to examine the mines owned by George W. Veach, Frank Bradley and others. The mines of Union district will give employment to thousands of men when they are properly handled.

Washington District.

AT WORK.—Belmont *Courier*, May 22: Shaw is still working his mine in Washington district. The ores in this mine are of a smelting character. Capital will handle this mine some day and then there will be a big stir in that section.

WAITING FOR SILVER TO GO UP.—The owners of the St. Helena mine, Washington district, are waiting for silver to touch par before they commence operations on that property.

UTAH.

SANDSTONE NOTES.—*Southern Utah Times*, May 23: At the California, a new drift has been started on the 700 level, north. A fine body of ore has been struck, the extent of which cannot yet be ascertained. The Silver Gate continues to show up in good shape. Drift is now in about 40 feet, showing four feet of splendid ore assaying 1028 ounces in silver. Bales & Holling are now sending a 50-ton lot of ore from the Gate to the Leaching works. In the Buckeye, the south drift on the 700 level still produces ore. In a crosscut on the same level, running in a northerly direction, several nice stringers of ore have been met with throughout its length of 50 feet. These stringers evidently run to the main ledge, which will probably be tapped within 20 feet and a good body of ore opened up. Work progresses favorably at the Stormont, which continues to furnish a regular supply of ore to the River mill. A few days ago, F. W. Taylor, a member of the Russell Process Co., came up from New Mexico. His visit was for the purpose of examining the working of their process in the Harding works. After a brief stay in camp he proceeded to Pioche to inspect the Godbe works. The Harding works have been operating successfully since the enlargement of their plant. The rolls are in place and it is expected that crushing will be begun about Wednesday next. The supply of crude ore will be sufficient to keep the rolls running for a long time without drawing upon the tailings dump.

ALTA COMPANIES.—Cor. Salt Lake *Tribune*, May 20: According to the invitation extended to your correspondent per Messrs. David Hepburn, Wm. Green and Wm. Weir, the lessees of the Old Emma works, I visited the mine and find a vast amount of work has been performed in that celebrated mine. We started from the mouth of the Bay City tunnel about 1600 feet in a northerly direction, then we turned east about 350 feet, at the end of which we ascended an incline shaft 180 feet, making a connection with a small tunnel about 50 feet long leading to the ore body, or where the cave happened years since. The lessees have been working on the same ore body all last year, in removing and washing the same, and have done well. They have still their lease on the same and have been working all last winter removing ore through the Bay City tunnel. Now they have a large body of ore on the dump ready for the washing process. They have already nearly 300 sacks of ore ready for shipment. Each sack averages 110 pounds and \$140 per ton. An extra force of men have been employed at the New Emma for the purpose of putting up the stacks, and Mr. John Ford will start the machinery to-morrow for the purpose of pumping the water out of the mine. Superintendent James Tavish, of the Moltke mine, is here. He has been to the mine and has everything ready to start as soon as he receives orders from Henry Wagner, Esq., the owner. Tavish expects to make a larger shipment this year from the Moltke. A good quantity of ore is ready for shipment in the Kittie mine, the property of Charles Tavish and James Tavish. Mr. Albert Fuge, the engineer-in-chief and foreman of the Frederick, told your correspondent he has everything ready to start as soon as he receives his supply of coal. Foreman Siceman was in town yesterday and reported that the east drift of the Superior tunnel is looking well and his men are in good spirits.

THE CRESCENT.—During the past week the Crescent Company shipped 22 tons of high-grade ore. The shipments of concentrates for the past four days aggregated 125 tons. The first big shipment of Crescent concentrates was made the first of the week. Four hundred tons were in the lot; the assays went about 25 ounces silver and 35 per cent lead to the ton, and about \$10,000 was realized by the sale of the concentrates. The Daly bullion shipment for the week aggregated eight bars of silver.

ORE SHIPMENTS.—The Mackintosh sampler received from the 22d to the 28th inst., inclusive, 227,840 pounds of Daly and 19,400 pounds of Sampson ore.

MECHANICAL PROGRESS.

Cast Steel for Crank Shafts.

In a paper recently read before the British Steel Institute by Mr. Hall, he again deals with the vexed question of marine shafting and cranks. He reminds the members that the paper which he read two years ago on "Cast Steel as a Material for Crank Shafts," and which related entirely to material, was freely criticised. Mr. Hall, however, states that up to the present time he has seen no just cause to alter, in the slightest degree, his opinions as set forth at that time. On the contrary, his then convictions have been intensified beyond all expectations; and if he dared enumerate the number and condition of broken shafts that had, since that date, been brought under his notice, he should considerably astonish steelmasters.

Cause of the Failure of Steamer Shafts.

Mr. Hall, in an elaborate and able paper, proceeded to show that shafts rarely broke through pure overwork, but through the shaft revolving when bent or sprung into an irregular line of bearing. And he described the success which is attending the patents which Jessops are now manufacturing, having for their object the prevention of accidents to shafts, such as Turton's patent built-up crank shaft, and Verity's patent flexible ball coupling.

Flexible Crank Shafts at Work.

Mr. Hall recommends flexible crank and propeller shafting. He gives several instances of the satisfactory working of Verity's coupling. A ball coupling purposely thrown a quarter inch out of line has been at work for over two years and is still working well. Since Christmas there has also been a flexible crank shaft, 10-inch diameter, working in a steamer that had previously given great trouble with her crank shafting, but which is now giving every satisfaction. We gather the above from the English correspondence of the *Iron Age*.

NEW PROCESS OF MANUFACTURING CAR WHEELS.—At the works of the Dickson Manufacturing Company, in Wilkesbarre, a new machine and process, patented by J. J. Carr, has been tested with satisfactory results. It is claimed that while on the old method of molding, casting, dressing, and boring the wheels the average product of three men per day of 12 hours is 18 wheels, with the new process the same number of men can turn out one perfect wheel every minute, or 720 wheels per day. The principal feature seems to be the substitution of a steel core for one of sand in casting the wheel. This has been tried before, but no one had hit upon a means of getting this core out of the wheel after it was cast. This is now accomplished by a center key, which falls out upon a single stroke of the hammer and lets the steel core drop out, leaving the hole in the wheel perfectly true, and ready to be put upon the axle without any dressing or boring. The sand is run into the molding boxes by a hopper, and both matrices are molded and the pattern drawn out by the single revolution of a shaft driven by steam power. The matrices are borne away upon movable platforms to the cupola, and then the piece is cast as under the old process. The molding is done as rapidly as a revolving disk can carry the boxes under the pressers.

PITTSBURGH TEACHING ENGLAND TO MAKE STEEL.—It may read a little strange, but it is nevertheless a fact, that a prominent English iron manufacturer should send his son to America to learn how to make steel. Mr. Edgar Richards, the eldest son of E. W. Richards, an iron manufacturer of Middlesbrough, is, or a short time since was, at the Edgar Thompson Steel Works, actively engaged in learning the business of steel-making on American principles. This enterprise was entered upon in consequence of the fact that many Englishmen interested in the iron business have returned from short visits to this country with many "wrinkles" in the art, which are esteemed of much value in England. Among such visitors are named Mr. William Moore, of Messrs. Jennings & Co., of Middlesbrough; Mr. Theodore Fox, of the Newport Rolling Mills, in the same town; Mr. Thomas Wrightson, of the Teesdale Iron Works, Stockton; and Mr. Edward Williams, of the Linthorpe Iron Works, Middlesbrough. All these parties are men of experience in iron manufacture and all agree in swelling the volume of praise which is ever heard when an Englishman, who knows something of iron and steel making, and has watched the style of doing it in the States, gives his friends the benefit of the views which their transatlantic journey has developed. So says a reliable correspondent of an American journal.

COMPARATIVE ECONOMY OF EXHAUST AND DRY STEAM.—Supt. Manning, of the Amoskeag Company, Manchester, N. H., says, in a note relating to the comparative economy of exhaust and dry steam for heating: "On our lower level, where we always use a large amount of steam for dyeing and drying in case of low water, I can run out 36-inch by 6-foot Corliss up to a thousand horse-power without any change in the boiler except a slight increase of pressure, and whatever increase of fuel there is (of course there must be some) is so small that it falls within the daily variation due to other causes."

Steel Half the Cost of Iron.

Sir Nathaniel Barnaby, of the British Admiralty, says the English correspondent of the *American Manufacturers' Journal*, remarks that years ago the navy constructors had to pay an exceedingly high price for iron—a price heightened by the severe tests to which the material had to be put. The great change which has now come over prices can be seen from the fact that the material at present used—mild steel—is only half the price of the iron formerly employed. This, however, is cold comfort for basic steel-makers, or the makers of dephosphorized metal. Mr. B. Martell has found the basic material as used in shipbuilding in Germany to be very unsuitable, and he asserts that the German steelmasters admitted to him that it was unreliable. The fact, too, that Lloyds still decline to accept for classification vessels built of basic steel is a serious matter to the Thomas-Gilchrist steelmasters. Lord Ravensworth, however, and other engineers express the hope that Lloyds will before long see their way to modify the standard for the basic metal. It will well bear a test of from 24 to 27 tons, while Lloyds are requiring from 28 to 32 tons.

It is feared, however, that the general rage for cheapness in these days of economizing will lead to trouble, if more care is not exercised in purchasing iron for Admiralty or other use. The correspondent above alluded to expresses the fear that if the Admiralty continues its efforts to buy cheap steel, there may be another repetition of the "defective bayonet" affair or something worse.

ROUND STEEL FOR SCREWDRIVERS.—Why a screwdriver made from a flat bar of steel instead of a round rod, or one that is hexagonal in cross-section, should be preferred by a workman, can only be accounted for by the facilities that are offered by the flatness of the bar, in applying the forceps to assist in the torsional strains from the wrist. Perhaps it is to aid in the manufacture, as the round bar needs to be drawn out at the points, and is more difficult to secure in the handle. If not, there must be something gained in the way of leverage, or using as a lever in prying the work apart and many other applications for which the screwdriver was not intended. If a round bar of steel cannot be held securely in the handle of the driver, or a round blade be fastened strong enough to drive a screw with, the bar itself can be twisted to form both the blade and handle, by drawing out one end for the screwdriver, leaving enough length for the blade, then with a twist of one or more turns a well-formed handle is made with an eye or opening for the use of a bar when special strains are required. The loose end is brought down on the blade where the ferrule of the handle should be, and twisted closely round the shank. This class of a screwdriver is being introduced on the English market, and with the exception of the twist around the shank, which should have some of the properties of a weld, must make a very substantial tool.

DRILLING VS. PUNCHING IRON.—If the punch was boycotted in every carriage shop, this last means of getting rid of an objectionable article would contribute a little to the benefit of mankind. There was some excuse for using the punch before the days of twisted drills and improved drilling machines; now there is none, as the time necessary to drill through most irons that have to be punctured in a carriage shop is too slight to serve as an excuse for doing so much damage as is done when the punch is used. Driving the punch through a piece of iron weakens the fibers to a greater or less extent, it bulges when the metal is not very heavy outside the holes. The drill, on the contrary, cuts away the metal and leaves the iron around the holes intact. Some use punches because they want square holes for the bolt head; when a full square is necessary it is better to drill and then square up than to punch, but for ordinary use a square corner cut by a file into one side, and the three corners of the bolt filed away, is quite as satisfactory as a full square hole, and much better so far as the iron is concerned.—*Coach, Harness and Saddlery*.

SMALL SAW TEETH.—Speaking of small saw teeth, the *Boston Journal of Commerce* says: "The smallest teeth for a circular saw are not cut on the smallest saws. The saws for cutting rails by the abrasion process have no teeth at all, other than those formed by the particles of the saw plate. The saws for slitting gold pens are less than seven-eighths inch in diameter, but they have quite a respectable tooth to work with. The smallest saw we ever used was less than one-half inch across it, and was used for sawing veneering where the saw arbor rested on the work. The feed rolls would not admit of a larger saw, as a knife edge was intended to be used instead; but the cut from the knife would form side cracks whenever the work was dry, which would show badly when the thin stock was bent. This saw would remove, in the form of fine cuttings, what the knife was obliged to crowd to one side, and relieve the tendency of the saw to follow in the grain of the veneering; but where toothless saws are used they are driven with great speed and they require a large amount of power to drive them."

SCIENTIFIC PROGRESS.

The Birth Throes of the Moon.

The tidal wave, set up on the earth by the moon, reacts to a certain extent also upon the moon's orbital period. The moon is dragged forward in its path by the terrestrial tidal wave, as certainly as the tidal wave is drawn backward on the rotating earth by the moon, and this implies an enlargement of the orbit of the moon, and a recession of the moon from the earth. This process must go on until the day and the month both meet in a common period of about 1400 hours. But if this be the case, the moon must have been once much nearer to the earth than it is now. Prof. Darwin carries back his investigation in this direction to a time when the moon revolved about the earth in somewhere between two and four hours, and in a position where it was nearly in contact with the earth, and in which it was rotating in the same period—a state which may be looked upon as having been antecedent to the time when friction began its "work of grinding down axial velocity and expanding orbital range." The moon then started on its long spiral journey out from the earth. Prof. Darwin calculates that this start occurred not less than 54,000,000 years ago! But the most rapid rate of rotation in a fluid mass that would be consistent with spheroidal equilibrium is two hours and 20 minutes. One second of augmentation more than this in the rate of rotation would inevitably cause the rotating mass to fly asunder. The presumption is that the earth did fly asunder from overfast spinning, and that such disruption was coincident with what Miss Clerke speaks of as the "birth throes of the moon." Prof. Darwin, however, conceives that, in all probability, the lunar-terrestrial system is an exception among the bodies swayed by the sun, due to the circumstance that the moon is proportionally by far the most massive satellite known, and that the influence of tidal drag has been concomitantly great. No other satellite ever possessed tide-raising capabilities at all comparable with the influence which is exerted by the moon. The separation of satellites from their primaries essentially depends upon the attainment of a disruptive rate of rotation—an effect which may be prevented by the secondary effect of the additional tidal drag set up by the sun keeping down the velocity of the rotation of the primary below the velocity that would correspond with the actual point of disruption. The earth just escaped this degree of retardation, and hence the existence of its solitary satellite.—*Edinburgh Review*.

New Field for Investigation.

Condensing Smoke by Means of Electricity.

From Tyndall's experiments on the dust found in the air, Messrs. Clark and Lodge observed that a body at a higher temperature than its surrounding medium is enveloped in a thin stratum of air absolutely free from dust.

Mr. Lodge, of Liverpool, conceived the idea of studying this phenomenon, making use of electricity. In the course of his experiments he discovered that electrical discharges produced at high tension by a static machine possessed the property of condensing dust and smoke of all kinds.

This was not slow in finding a ready application in metallurgy, for condensing the dangerous fumes and dust of lead, dust in factories where that metal was largely used. The results secured were remarkable, and the attention of students was particularly called to this new method of treatment, because it had a twofold bearing—on the health of the workmen and on the economy of the process.

A contemporary says the experiments of Mr. Lodge are of that class which will in time become classical. He prepared especial devices for conducting his experiments, by which the effect of the electric discharge upon smoke and dust might be readily observed. He constructed a glass cylinder within which were placed two electric combs opposite to each other and at such distances apart as would admit of the ready passage of the electric spark from the positive to the negative comb. These combs were connected with the opposite poles of an electrical machine. The cylinder was placed over any convenient smoke or dust creating device, from which the smoke or dust ascended to the cylinder to be then acted upon by the electric spark or current.

German tinder, for instance, is put into the furnace. The thick smoke which it produces passes through the apparatus. If the electrical machine is now put in motion until the sparks pass between the combs, immediately the smoke becomes agitated, and in a little while will disappear by condensation, while the cylinder becomes as transparent as before the experiment.

The smoke of German tinder can be advantageously replaced by that which is produced by the combination of hydrochloric acid and ammonia. The white thick smoke of hydrochlorate of ammonia condenses very rapidly on the electrified combs. Tobacco smoke is very quickly and easily condensed by means of this device.

The phenomena are very remarkable, and appeal at once to the eye, the artisan, the medical man, etc., and at once opens up a new, useful and interesting field for investigation.

How Does the Brain Work?

How does the mechanism of the brain really act? I believe the true answer to this question is the one most fully given by M. Ribot, and never yet completely accepted by English psychologists. It acts, for the most part, as a whole; or, at least, even the simplest idea or mental act of any sort is a complex of processes involving the most enormously varied brain elements. Instead of "dog" being located somewhere in one particular cell of the brain, dog is an idea—audible, visible, legible, pronounceable—requiring for different modes of its perception or production the co-operation of an enormous number of separate cells, fibers and ganglia.

Let us take an illustration from a kindred case. How clumsy and awkward a supposition it would be if we were to imagine there was a muscle of dancing and a muscle of walking and a muscle of rowing and a muscle of cricketing and a muscle for the special practice of the noble art of lawn tennis! Dancing is not a single act; it is a complex series of co-ordinated movements, implying for its proper performance the action of almost all the muscles of the body in different proportions and in relatively fixed amounts and manners. Even a waltz is complicated enough, but when we come to a quadrille, or a set of the lancers, everybody can see at once that the figure consists of so many steps forward and so many back; of a bow here and a twirl there; of hands now extended both together, and now held out one at a time in rapid succession; and so forth throughout all the long and complicated series. A quadrille, in short, is not a name for one act, for a single movement of a single muscle, but for many acts of the whole organism, all arranged in a fixed sequence.—*Popular Science Monthly*.

A NEW EDIBLE VEGETABLE.—We expect that every year will bring a number of new varieties of well-known vegetables. Indeed, it would be a poor year if the English seed-growers did not give us at least half a dozen new peas or new names, but to have an entirely new vegetable added to the list is something noteworthy. The fact that this novelty is offered by a house of world-wide fame indicates that the new plant has some merit. The plant in question is *Stachys affinis*, which is a native of North Africa; it belongs to the mint family, and, what is unusual in that family, produces fleshy, tuberous roots which are the edible portion. The *American Agriculturist* says: The tubers are dressed like string beans, or fried in the form of fritters, and are said to make an excellent pickle. When freshly dug the tubers are pearly white, but upon exposure to the air they become blackened; hence it is advised to dig them only as wanted for use, or if dug in advance, to keep them covered with earth. *Stachys affinis* is the botanical name, and we are given "Choro-Gi," as a synonym, probably the name by which it is known in its native country. The plant is said to be very hardy, and to produce abundantly without special cultivation. Whether this will be a useful addition to our list of vegetables can only be ascertained by trial in various parts of the country; at present, it looks as if it would be an amateur's or "fancy" vegetable, rather than a regular crop for market.

PECULIARITY OF TORNADOES.—A resident of Minnesota, who has seen several severe tornadoes, says that their most peculiar feature is the singular sucking movement. Buildings are sucked up into the clouds entire, and come down soon in fragments. After the great Rochester tornado, a farmer 12 miles from town found an uninjured marble-top table in his field. Another found a very large sheep that had come from no one knew where, and had been deposited in his yard unhurt. The Minnesota man further said that he had seen a board into which wheat straws had been driven until they stuck through on the other side.

STANDARD OF LIGHT.—Professor John Trowbridge, in objecting to the light emitted by a surface of platinum at the point of solidification, adopted by the Paris Conference as the standard of light, contends that a better one might be found in an incandescent strip of platinum radiating a definite amount of energy, this energy being measured at a fixed distance, which will best agree numerically with the absolute system of measures now universally adopted in heat and electricity.

PASTEUR discovered that when milk was heated for a short time at 172°, and then suddenly cooled, it kept sweet much longer than the unheated milk. Dr. J. Van Geuns finds that this treatment disables and destroys most of the lower organisms in the milk, so that they are only able to revive when the conditions of temperature are extremely favorable.

A STRANGE SUBSTANCE has been found in Ellijay, Georgia, and is thus described by the *Courier* of that place: It is a yellow substance, very much like beeswax, and when shaved off with a knife it rolls up like beeswax. There is nothing about it that burns, but when heated it becomes hard as flint. It is a kind of rock, but nothing like it has ever before been seen.

EFFECT OF SUNLIGHT.—It is a remarkable fact in relation to the chemical action of the solar rays that cinchona trees growing in hot-houses develop no quinine in their bark,

American Tin at Last.

Within two weeks a new American industry will be born and American tin will make its bow to the commercial world and begin a vigorous competition with the foreign article. Almost three years have passed since the first deposit was discovered in Pennington county, Dakota, among the Black hills. To-day the Harney Peak Tin Mining and Milling Company has almost ready for operation a mill run by a 200-horse power engine, capable of reducing in its powerful embrace 200 tons of tin ore daily, and 100,000 tons of that ore have been opened up and are now awaiting the ordeal.

A specimen pig, said to be the first ever made in the United States for strictly commercial purposes, has been placed on exhibition at the Metal Exchange, and at the New York Metallurgical Works, on Washington street, may be seen a monster specimen of the ore, weighing 9000 pounds, which is destined to astonish John Bull in his own bailiwick. This specimen was blown out of a mass of ore taken from a tunnel in the Etta mine, on Tin Mountain, that was estimated to weigh 20 tons.

How rich the deposit is may be judged from the fact that the treatment in the metallurgical works of five tons of average ore from the Etta mine resulted in the production of 51 pounds of metallic tin to the ton—a considerably higher per cent than is shown by any mine in Cornwall. Moreover, it is said that the deeper the workings go the greater is the per cent of metallic tin to the ton.

Nor is the Etta group of two lodes the only source of supply owned by the Harney Peak Company. Thirteen miles away is the Hill City Group, comprising 43 lode claims, containing true fissure veins of unusually rich tin ore. Here a small mountain of mined ore is piled on the dumps, awaiting the completion of the mills.

What is to be the future of this industry? We import in round numbers \$6,000,000 worth of tin yearly, and the consumption is increasing as fast as new uses for the metal are being found. The mines of the Old World are nearing exhaustion and the new supply must be American. The richness of the deposits and the peculiar natural advantages in the matter of water and facility of transportation about the district reduce the cost of production to ridiculously low figures—the estimate being one dollar per ton for mining ore, and one dollar per ton for milling it.

With all these advantages for facilitating a large output, the promoters believe that the market cannot be materially affected for five years to come. In the meantime it is proposed to still further invade the English domain and enlarge the American field by the manufacture of tin plates, and a syndicate of prominent Pittsburgh iron men, after a thorough investigation into the causes that made earlier attempts unsuccessful, are preparing to make tin plate from the Harney Peak product, so intrinsically superior that the English article will be unable to compete with it.—*New York Ironmonger*.

A NEW DISTRICT.—Several months ago A. P. Rhodes and Geo. Plant went out prospecting and discovered some good prospects in the southeastern part of Death Valley, about eighty miles northeast of Calico. The district has been named Hope Springs, and the claim on which they are working, Black Metal mine. The mines are situated seven miles from a good spring. A shaft has been sunk 15 feet, and the ore taken from the same samples well. Mr. Rhodes recently brought to the mill at Daggett 1200 pounds of ore from the mine, the pulp assay of which went \$132.47 to the ton. From present indications the mine will yield considerable ore that will average \$100 to the ton. The belt in which this mine is located has been prospected for two miles, and ore discovered at intervals its entire length. The owners of the group are A. G. Rhodes and George Plant, who own one-third each; Mrs. Humiston and her nephew, William Kelly, who own the remaining one-third. The owners of this new find are pleased with their prospects, and will prosecute developments as long as they show up as well as at present.—*Calico Print*.

N. CLARK & SONS, proprietors of the Pacific Pottery Works, Sacramento, the oldest clay workers in the line of pipe and fire-brick upon the Pacific Coast, are building branch works at Alameda Point, near Alameda county. The foundations for the buildings are laid. The structure will be 260 by 110 feet, and four stories high. Steel boilers will be put in of 150-horse power, with engine to correspond. The new works are for the express purpose of manufacturing fire-brick, and perhaps at a later date other clay products.

NEARLY 60,000 barrels of lime have been shipped, by steamer alone, from Santa Cruz during the past year, of which amount Meere, Davis & Cowell have shipped about 50,000 barrels, all of which has gone over their own wharf—about 35,000 barrels to San Francisco and about 15,000 barrels to points on the Southern coast. During the same period the I. X. L. and the Holmes companies have shipped the remaining 9000 to 10,000 barrels from Felton over the railroad wharf to ports South.

To CLEAN red brick floors, rub them with a brick of the same color, moisten with a little warm milk and water, and wipe dry with a soft cloth.

USEFUL INFORMATION.

Electro-Deposition of Steel.

The *Manufacturer and Builder* gives the following: For this purpose many formulae have been proposed, the principal use for the product being the coating of copper electrotypes, for printing, with a steel surface, to give them better wearing qualities in the press. The baths formed of the double sulphate of iron and ammonium, or the sulphate of iron and chloride of ammonium, appear to be best adapted for the purpose. The first of these is prepared either by making a saturated solution of the crystals of the double salt, or by mixing a saturated solution of the two salts (the sulphate of iron and the sulphate of ammonium) in their equivalent proportions; or by precipitating a solution of the sulphate of iron with carbonate of ammonium, and dissolving the precipitate by the careful addition of sulphuric acid, avoiding an excess of the acid. The sulphate of iron and chloride of ammonium bath is prepared either by mixing the two salts together in their equivalent proportions, or by dissolving in a saturated solution of the sulphate of iron as much chloride of ammonium as it will take up at the ordinary temperature. All of these baths should be made as concentrated as possible, and should be maintained quite neutral. For an anode, use a plate of rolled iron, with at least eight times the surface of the article to be coated. The current should be of moderate strength. The deposited metal is as hard as cast steel, but very brittle. It may be tempered by annealing. With regard to the electro-deposition of this metal, it may be said that all the supposed advantages to be obtained from iron (or steel) surfaces on copper or other metals or alloys are practically gained by the use of a nickel coating, so that the importance attached to these processes a number of years ago, before nickel-plating came into vogue, has disappeared. Many electrotypes coat their copper printing plates with nickel, for the double purpose of adding to their durability in the press and of preserving the integrity of their colored inks, some of which—notably vermilion—act chemically on copper, producing a brownish color on the printed page, due to the formation of a sulphide of copper.

A SOMETIMES VALUABLE HINT.—Sometimes even a very slight knowledge of natural history is of great practical use. As an illustration, we give the following, related by a naturalist. A gentleman, making a call at the house of a friend, was astonished to find the rooms and passages in confusion; and, on inquiring the cause, was answered: "Oh, we are very much annoyed here; a rat has come to finish his existence under the floor of our large drawing-room. We do not know the exact place, but we cannot endure the stench any longer; so we have removed the furniture, rolled up the carpets, and called in the carpenters, who are just beginning to take up the floor." "Now, don't be too hasty," said the visitor; "you need not pull up more than one board. I will show you what I mean presently; and meanwhile, shut down the drawing room windows, and close the door." He then stepped down into the garden, walked around to the horse stables, and after a few minutes' absence came back to the drawing-room with both hands tightly clasped. Placing himself in the center of the drawing-room, he opened his hands, and out flew two large blue-bottle flies, and buzzed around the room for a second or two. But presently one of them alighted on a certain plank of the floor, and was almost immediately followed by the other. "Now, then," said the visitor, "take up that board, and I'll engage that the dead rat will be found beneath it." The carpenters applied their tools, raised the board, and at once found the cause of the unpleasant smell.

CARVED GLASS.—At one time glass encompassed gold, not only in value as a material, but in forms of vases and drinking vessels wrought into various patterns by means of wheels and points. An article of the kind was considered a worthy present for a king. Glass carving is a branch of the art of carving precious stones began by the lapidary savage and improved with more or less ability by workers in archaic times and earliest civilizations. In the Greek and Roman periods, when the glyptic art was encouraged as a whole, carving on glass may be said to have reached its zenith. Perhaps it is to the latter Greeks and Romans that we are indebted for the finest work of the kind. Colored glasses were generally preferred to glass of only one color for carving, and at the present time cameo work, or relieve, in one color or more than one, upon ground of a different color, is growing in favor of the educated and wealthy at home and abroad. To England is due the honor of reviving the art of carving glass.

GIVE THE BOYS TOOLS.—Give the boy tools, and let him find out for himself whether he has got any mechanical taste or not. Do not discourage him, as parents are apt to do, by saying: "Oh, it is no use for you to try to do anything with tools. I never had any taste that way, and, of course, you have not." If a boy finds he can make a few articles with his hand, it tends to make him rely on himself. And the planning that is necessary for the execution of the work is a discipline and an education of great value to him. The future welfare

and happiness of the boy depends on the surroundings of his youth. When he arrives at that period in his life when he is obliged to choose what profession or what line of business to follow, it is highly important that he should take no false step. And if in his youth he has cultivated a taste for any particular branch, the choice of a profession or business will be made more easy. We hope to see manual training in the public schools, for this hand, as well as the brain, should be taught, that they may both be of more use to each other.

SOAP TO CLEAN STEEL.—A soap for cleaning surgical instruments, and other articles of polished steel which have become flecked with rust by exposure in showcases, is made by adding precipitated chalk to a strong solution of cyanide of potassium in water until a cream-like paste is obtained. Add to this white castile soap, in fine shavings, and rub the whole together in a mortar until thoroughly incorporated. The article to be cleaned should be first immersed, if possible, in a solution of one part of cyanide of potash in four parts of water, and kept there until the surface dirt and rust disappear. It should then be polished with the soap, made as above directed. Articles so treated look as "good as new."

LACE WORK ON GLASS.—An inventor of Metz has produced the effect of lace work on glass, and the process is thus described: After the articles in question have received a slight coating of turpentine, a metal or paper stencil is applied, which represents a lace pattern, and the objects are strewn with a fine powder of asphalt and mastic. The stencil is then removed with care, and the glass is heated to such a temperature as will melt the powder. The acid, to the action of which the glass is then exposed for thirty or forty minutes, cannot affect the covered portions, but only acts upon those which have remained free. This process has the advantage of being very rapid in its effects.

TO SOFTEN HARD PUTTY.—To soften putty that has become hard by exposure, so as to remove it easily from a sash, take one pound of pearlash, and three pounds of quicklime; slack the lime in water, then add the pearlash, and make the whole about the consistency of paint. Apply it to the putty on both sides of the glass, and let it remain for 12 hours, when the putty will be so softened that the glass may be taken out of the frame with ease.

GOOD HEALTH.

VITAL STATISTICS OF THE NATION.—It appears from the latest report of vital statistics, just completed for the census of 1880, that there were 756,893 deaths during the census year—classified as follows: Unknown causes, 37,183; consumption, 91,270; pneumonia, 63,053; diphtheria, 33,143; heart disease, 26,065; cholera infantum, 24,983; still births, 24,876; typhoid fever, 22,854; malarial fever, 20,231; croup, 17,966; convulsions, 17,844; scarlet fever, 16,388; dropsy, 14,788; debility, 14,619; old age, 14,168; paralysis, 13,907; dysentery, 13,427; cancer, 13,068; enteritis, 12,640; diseases of the brain, 12,280; whooping cough, 11,064; bronchitis, 10,984; inflammation of the brain, 10,903; diarrhea, 10,829; apoplexy, 9658. The ravages of that terrible disease cancer appear very prominent in the classification, averaging one death in every 57. The mean annual increase of births over deaths was 878,522, or the birth rate equal to 36 per 1000. The United States in the census year had a comparatively low death rate and a high birth rate. The death rate is shown to have been higher in the colored than in the white population; in the foreign element than among the whites of American parentage; in the cities than in the rural districts.

INTEMPERATE EATING.—If it is legitimate to estimate a part of the criminality of whiskey-drinking by the results, by crimes committed while under its influence, it is equally legitimate to refer much of the irritability of the dyspeptic to mince pies, new bread, rich pastry, indigestible foods in general, so vitiating the stomach, and through it the whole nervous system, that good health and physical comfort are impossible. Neuralgia is certainly results from the excessive use of tea and coffee, as drunkenness does from whiskey. Mental obscurity may as well result from gluttony as from dissipation, while it may as certainly be regarded as a sin to be a dyspeptic as a drunkard, both resulting from excesses, the one from intemperance in eating, the other from drinking. Both are alike avoidable, for the consequences of which we are personally responsible.—*Medical World*.

SOOTHING SYRUP AND THE OPIUM HABIT.—There is no better way to have the way to the terrible opium habit than the practice of many mothers in making a too free use of the well-known "Mrs. Winslow's Soothing Syrup," which is composed of simple syrup, anise and morphine. This syrup is usually given on the slightest provocation or appearance of uneasiness in infants, and often when no provocation appears, given merely to continue sleep and quiet so that the mother can keep on with her work, or leave the baby with a nurse while she goes to call on a friend. This syrup should only be given when all other methods of allaying uneasiness fail.

A CHARM AGAINST DISEASE.—Many people fall ill of disease simply through fear of it. The imagination has a powerful influence on the human body. One can very easily imagine himself to be catching cold at the sight of an open window, when if he did not know the window was open, or was not afraid of its effects, he would escape the cold. Doctors understand this secret, but they do not impart it to their patients. Most invalids, real or supposed, would be angry if a physician would say to them, "Nothing ails you, you only think so." They prefer to think themselves sick, and in time they really become so, for nature, though she struggles hard, cannot stand everything. Too many drugs will finally destroy her healing power. These people who love to have a box of white pills in bottles, and a little book, all kept in some handy place, so that when a friend who has eaten too much dinner says, "Oh, I am fearfully nervous!" they may run for the little book, look for "nervousness," and administer so many pills of hryonia. When they have a headache, instead of dieting or eating more moderately, they take several drops of some nice poison. They trust nothing to nature, but call in a doctor for every little ailment, when fresh air, exercise and strict temperance in eating and drinking is all they need.

TOBACCO BLINDNESS.—The anti-tobacco people ought to have their attention called to the fact that "tobacco-blindness" is becoming quite a common affliction. At present there are several persons being treated for it at one London hospital. It first takes the form of "color-blindness;" the sufferers who have smoked themselves into this condition being quite unable to distinguish the color of a piece of red cloth held up before them. That is the popular medical test, though there is also a more scientific one. Eventually the victim to "tobacco-blindness" sometimes loses his eyesight altogether. Although smoking is to a large extent the cause of the malady, and so gives it its name, heavy drinking is also partly responsible. Unless the smoking and drinking go together the "tobacco-blindness" is not serious. A proof of this is that if a doctor has a case of it in hand, he always insists on abstinence, when, as a rule, the sufferer gradually regains his sight.—*St. James' Gazette*.

DARKENING ROOMS.—The American custom of darkening the rooms where visitors are received has arisen from the natural cause of the peculiar brightness of American skies. Glare is always distressing to sensitive persons, and American glare is phenomenally brilliant at times. Not even the sunlight of the tropics is more penetrating than this steady, blinding light; white, blue, steel in its strange atmospheric quality. To subdue this brilliance, to tone down the reflection, is the aim of most American women who have an atom of vanity in their compositions, and hence the darkened rooms where all that is beautiful and artistic may lie in shadow, though touched here and there by faint glimmers of firelight, or the tender glow from a silken window drape. American drawing-rooms have until recently been victims of "cross-lights," which destroyed the artistically blended colors in the furniture and ruined the pictures and decorations on the walls.

COFFEE-EATING HABIT.—A correspondent of the *Medical and Surgical Reporter* mentions the case of a young woman of 22 who had acquired the habit of eating roasted coffee beans. Though the habit was only of four months' standing, she had eaten as much as half a pound a day, and had only decreased to four ounces per day on the earnest solicitation of friends. The effect on her health had been that she became pale, sallow and nervous; the pulse weakened, the stomach got out of order, and, among other symptoms, there was a marked dyspnea in going upstairs. An attempt to stop the habit was followed in a few hours by intense nervousness, trembling and a strong desire for coffee.

A PASTEUR LABORATORY FOR NEW YORK.—There is the prospect of an establishment in New York of a branch of Pasteur's laboratory, to which Americans in danger of hydrophobia may hereafter resort instead of traveling to Paris. Dr. Valentine Mott, son of D. B. Mott, one of the most noted surgeons of New York, has been over to Paris to study Pasteur's methods, and brought back with him a stock of rabies virus and an inoculated rabbit. The rabbit died Saturday. The next day Dr. Mott and his father inoculated another, and are now prepared to start a hospital as soon as they can find proper quarters.

PHOTOGRAPHY IN MEDICAL PRACTICE.—Some novel and interesting applications of instantaneous photography to the study of the movements of the heart and intestines have recently been made by Dr. W. G. Thompson. Photographs of rabbits' pigeons' cats' and frogs' hearts were made, showing the action more clearly and accurately than is possible by other methods. In addition to the value of such in physiological teaching, the most practical application of the method will be the illustration of the changes in the form of the heart and intestines produced by drugs.

TURPENTINE IN LOCKJAW.—Warm a small quantity of turpentine and pour it on the wound, no matter where it is, and relief will quickly follow in an attack of lockjaw. So it is said.



A. T. DEWEY. W. B. EWER.

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Saturday Morning, June 5, 1886.

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Passing Events.

It is pleasant to note that silver has advanced a little from the very low price prevailing of late. The rise is not very much, but that the downward tendency has been checked is encouraging.

Considerable prospecting is now going on all over the coast, the more mountainous regions now being freed from snow. The streams are running full from the melting snows, and all the mills have plenty of water.

There is a tendency apparent among miners just now to go north rather than south from here. Many have gone to Alaska, and others are going to Oregon and Idaho. The field for prospecting in this State is, however, by no means thoroughly covered, and our northern counties are being pretty well searched this season.

In Arizona the Indian trouble is still keeping mining matters back. It is difficult to enlist the aid of capital in the Territory while Indian raids may be expected. Arizona will never reach its full tide in mining prosperity until the Indian question is satisfactorily settled.

A fine body of coal has been found at the head of the Estrella plains, San Luis Obispo county.

Mineralogy at the University.

At the last meeting of the Board of Regents of the University of California, on recommendation of the Finance Committee, \$1250 was appropriated for the purchase of mineralogical specimens from the Royal Saxon Mineral Depot for the university museum.

It was also resolved to create a separate department of mineralogy, petrography and economic geology in the university, and A. Wendell Jackson was appointed professor of the department. Professor Jackson has for a long time been instructor in the departments mentioned, and now obtains the professorship. He is an enthusiast in his chosen branches, and is recognized as a very able man. He is not content with mere lecture work, but has constantly pursued original research, and some of his investigations have been of the highest interest and value. The museum of economic geology, the founding of which is due to his efforts, is already large and receiving valuable additions. It renders possible a course of instruction in ore deposits, which is of essential importance to those who intend to pursue the profession of mining engineer. Moreover, the ore deposits of the Pacific Coast are being brought together for the first time in one institution, where they can be subjected to careful and critical comparative investigations, in order that the laws of their occurrence may, as far as possible, be determined. The locality, form, thickness, dip, strike, wall-rock, etc., of every ore deposit on the coast are carefully recorded as soon as accurate information on these points can be obtained.

In petrography the rocks are determined by means of their microscopic sections; they are then arranged systematically and geographically, so that as the collection becomes more complete the geographical distribution of the rocks of the Pacific Coast will be known with great accuracy and detail. The collection of mineralogy, also under Prof. Jackson's charge, is fully arranged and very large.

Prof. Jackson lectures twice a week at the university on crystallography, mineralogical terminology and descriptive mineralogy, and careful examinations of specimens are allowed illustrating every form of occurrence of each mineral. He also instructs in the determination of unlabeled minerals by means of their physical properties only, the apparatus used consisting of penknife, pocket lens, streak plate and magnet; all easily carried in the vest pocket. The object of this course is to give the student sufficient familiarity with the most commonly occurring minerals of economic and geological importance, to enable him to recognize or determine them in the field.

The course of instruction in petrography covers the following ground: The different methods of rock investigation; rock texture and structure; different forms in which rock masses occur; classification and nomenclature; origin of rocks; change and decomposition of rocks. The course is fully illustrated with hand specimens and rock sections.

The course in microscopic petrography embraces instruction in the theory and use of the microscope, investigation of rock sections, micro-texture of rocks, etc. In economic geology the instruction includes a general discussion of the form, structure, composition and origin of different kinds of ore deposits, followed by detailed descriptions of the ore deposits of this country and the specially instructive foreign deposits.

Prof. Jackson's work is not changed by his promotion. We are glad to see him given the title, however, for he deserves it, and it is another evidence that the mining department of the university is being more fully recognized by the Regents.

PRACTICAL HYDRAULICS.—Mr. P. M. Randall's book on this subject is now printed and bound, and ready for sale by Dewey & Co., 252 Market street, S. F. As a convenient work of ready reference for miners, irrigators, or hydraulicians, it is not excelled. The matter is fresh, concise, and well arranged, and the index makes it easy to find the answer to any question in this branch readily.

THE 120th dividend of the Ontario Mining Company of 50 cents per share is payable on the 31st ult. The total of the five months of 1886 is \$375,000; grand total to date \$7,500,000. The stock is quoted from \$23.50 to \$29 per share.

The Selby Smelting and Lead Company.

The new works of the Selby Smelting and Lead Company, at Port Costa, are now entirely completed, and they have almost finished "cleaning up" the old works at Black Point. A great deal of the old material had to be worked up, and now that this is done the company is making more prompt returns than ever. On the 27th of last month the capital stock of the company was increased from \$200,000 to \$600,000, which is fully paid in, and they have a large surplus over and above this. The very unpleasant litigation in connection with the Albion-Richmond mining companies affair has all been satisfactorily settled. Arrangements have lately been made with the Bank of California, Wells, Fargo & Co., and Nicholas Luning, which secure to the company the advantage of having men closely identified with them who have experience and knowledge of the business, and who, themselves, control the larger portion of the gold and silver product of the coast. Therefore, these business relations are pleasant and convenient.

It is gratifying to know that the business of the company has greatly increased of late, with the increase of facilities afforded by the new and more extensive plant. Ore and bullion is now coming in from new districts which have heretofore been shipping entirely to the East. Montana and Washington Territory are now shipping more or less material here, which has not before been the case. Arrangements have been made with the railroad and steamship companies to increase this interest, which will add to the volume of business materially.

It is pleasant to note also that the bullion product from different sources is gaining in amount each year, as available statistics prove. The amount of silver coming to this city has doubled within the past two years. This shows that not only are the mines increasing their output, old mines are being worked vigorously, and new ones being developed, but that new channels and more extensive connections have been made, the result of years of work in the development of our home resources.

The Selby Company now have facilities for working everything in the shape of ore, bullion, etc., that is offered, so it is no longer necessary to ship ore or bullion East or abroad from this coast. The gradual enlargement of plant, and increase of business facilities, undertaken and accomplished by the Selby Company, show that they have every confidence in the future of our mining industry.

Comparative Trials of Quartz Mills.

In the PRESS of last week appeared a letter from Mr. Louis Blanding, of Sonora, Tuolumne county, on the comparative merits of stamps and rotary pulverizers in reducing quartz. In the course of his remarks Mr. Blanding made some statements and drew conclusions as to the power required in operating the Tustin mill and the work accomplished by it at the Oro Plata mine, Murphy's, Calaveras county, which are incorrect. It is evident he was misinformed concerning the results of the trials referred to. For the benefit of Mr. Blanding, as well as others, we will give the facts in the case, obtained from reliable authority.

At the Oro Plata mine 15 stamps of 750 pounds, 6-inch drop, 90 drops per minute, crushed 30 tons of quartz per 24 hours, through a 20-mesh screen. This requires about 22-horse power. Four Tustin mills, working on the same ore and using the same screen, crushed at the rate of 48 to 50 tons of ore per 24 hours. The four machines required 17.68 horse power, or 4.42 horse power each, measured by the Prony brake, counted from the water-wheel.

The working result on low-grade quartz shows that more than twice as much gold is saved by amalgamation from the ore crushed by the Tustins as that crushed by the stamps. The reason for this is that the stamps make a pulp containing 45 per cent of elimes, while the Tustin pulp contains only eight per cent.

We shall shortly give the details of these comparative trials, with such diagrams and drawings as will serve to fully illustrate the subject.

THE loss by the fire at the hoisting works of the Grand Central mine, at Tombstone, will be \$250,000. The shaft is a total wreck. About 150 men have been thrown out of employment.

The Late Walter A. Skidmore.

Walter A. Skidmore, who has for many years been identified with the mining interests on this coast, and particularly in this State, died at his residence in this city on Saturday last. Mr. Skidmore was formerly a printer, but has not followed that occupation since 1871 or 1872. He published in the latter year a work on mining law. While R. W. Raymond was United States Mining Commissioner, and published an annual report, Mr. Skidmore was his deputy on this coast and gathered a large part of the material published in the reports. The main portion of the chapters on California were written by him, and he compiled and prepared the statistics of production also. On the discontinuance of these reports he was employed by the Director of the U. S. Mint to assist in the preparation of the material on California for that annual report. In the volume published last year were several well-written and valuable articles from his pen.

Mr. Skidmore has been for some years Secretary of the Miners' Association of California, and did a large amount of work in connection with the association while the debris suits were pending.

On occasions Mr. Skidmore has followed the business of reporting on mines. His familiarity with hydraulic and drift mines in this State gave him an experience that was valuable to his employers. In fact, he had a very intimate and accurate knowledge of mining affairs in California. Many articles from his pen have appeared in the PRESS from time to time during the past 12 years. He was a ready and forcible writer, possessing the ability to state his ideas clearly and in a terse and easily-comprehensible manner. He was one of the few men on this coast who has devoted his pen entirely to the development of the mining industry.

Mr. Skidmore had a deserved reputation for honesty, integrity and ability. He made friends wherever he went from his genial disposition and gentlemanly demeanor. He was a very generous man, possessing also other qualities which endeared him to all his associates. For some months past he has been confined to his room by the illness which resulted in his death, which will be regretted by a large circle of friends and acquaintances.

Mining Accidents.

An accident occurred at the Badger mine, Grass Valley, on Wednesday, whereby Patrick Mullen, one of the oldest miners in the district, received injuries that may terminate fatally. He was one of a party who have the contract for pumping the water out of the mine, and although there were 22 other men in the building at the time, no one has seen how the accident occurred. When found he was unconscious. It is believed, from appearances, that he went to cross the bob pit, but was not quick enough, and was struck by the bob and thrown into the machinery below him. His left foot was badly crushed above the ankle by the cog of the wheel, and the skin and muscles were all torn from the outer part of the left thigh bone. Besides this he had the two bones in his right leg broken, and received other severe injuries from which he is not expected to recover.

A Times Leadville special says: A cave occurred in the Colonel Sellers mine, in California Gulch, at noon Wednesday, in which Joseph Pretti, Louis Miller, H. Hitchcock and Louis Pretti, four miners, were caught. The men were working in a stope 300 feet high, putting in timber, and a heavy mass of ore caved in upon them, filling the stope. A gang of 150 men are working with all energy, but despair of recovering the bodies, as the water is rushing in so fast and ore keeps falling in upon them, so that it is hardly possible that the remains will be reached to-day.

VIRGINIA CITY newspapers complain that business there is rendered dull by the habit which miners and mechanics have got into of sending to San Francisco to make their purchases. Two hundred thousand dollars a month is disbursed in Virginia by the Comstock mines, but business was never so dull.

THE mills dependent on Virginia City mines are all busy. From good authority it is learned that there are undoubtedly more men employed in Virginia than there were four or five years ago.

A Curious Gold Mine—No. 3.

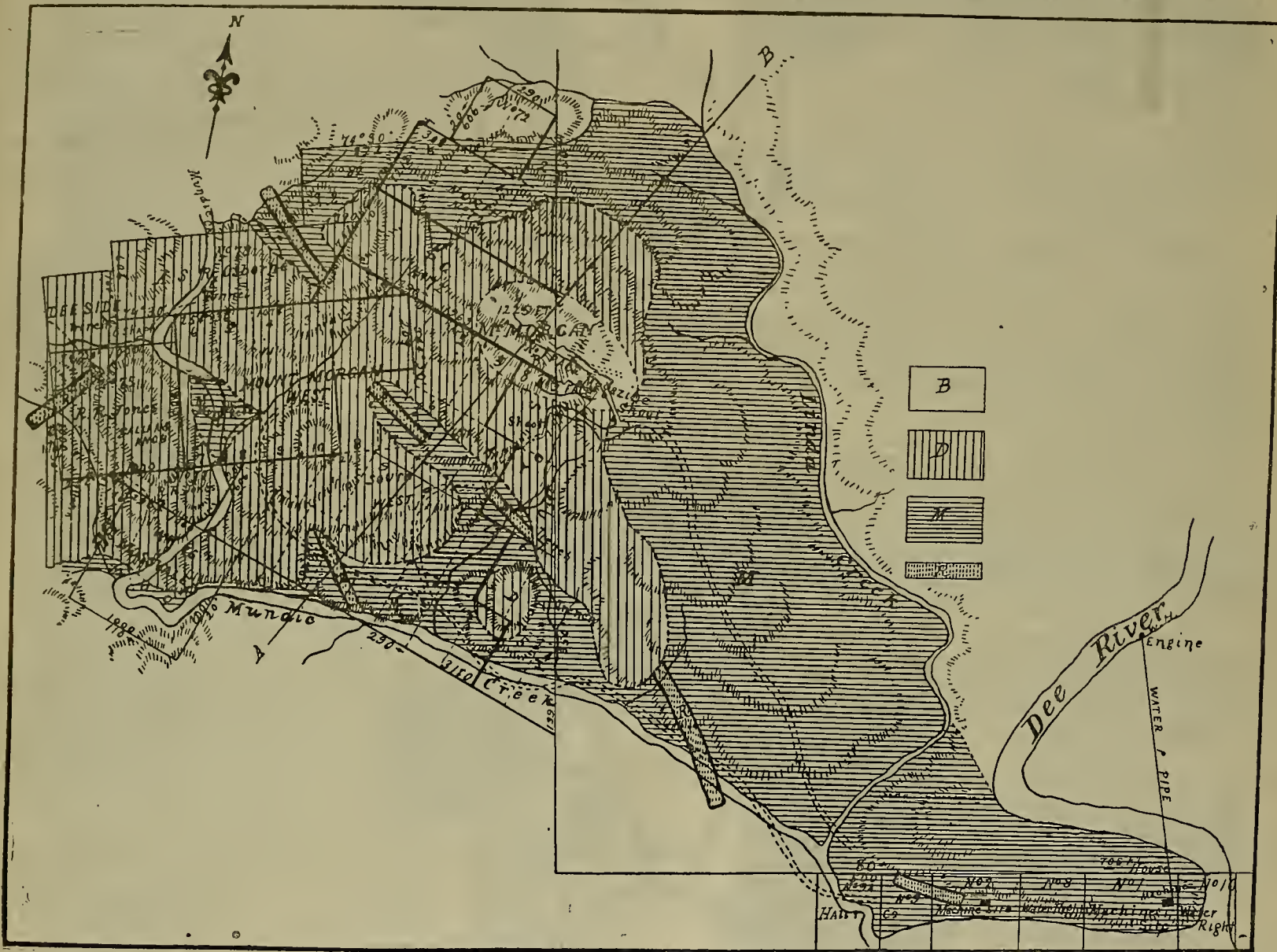
In the immediate vicinity of Mt. Morgan, the country rock consists of a bluish gray quartzite—a fine-grained siliceous sandstone, now more or less vitrified—full of minute crystals of iron pyrites and specks of magnetic iron ore, greywackes of the ordinary type, hard, fine-grained sandstone or mingled siliceous and feldspathic material, now somewhat indurated; and, lastly, occasional masses of shale, hardened to a flinty consistency, and a few belts of serpentine. As the stratified rocks in this particular locality appear to have been in thick beds, and as this metamorphism has gone a considerable length, it is not easy to be certain of either dip or strike. The stratified rocks are, moreover, interrupted and intersected in every direction by dykes and other intrusive masses of dolerite (itself altered by the substitution of viridite for

great blocks up to some tons in weight, with a stalactitic structure, as if the iron oxide had gradually filled up cavities left in the original deposit. The ironstone contains gold of extraordinary fineness, which, however, after a little practice, can be detected in almost every fresh fracture. The ironstone is more or less mixed with fine siliceous granules. Gradually, to right and left of the central mass, the silica more and more replaces the ironstone. It is a frothy, spongy or cellular sinter, sometimes so light from enlargement of air in its pores that it floats in the water like pumice. Fine gold is disseminated throughout this siliceous deposit as well as on the ironstone. Near the west end of the cutting is a vertical dyke of Kaolin, mixed with fine siliceous granules, passing into pure Kaolin, with some silicates of magnesia, including a fine variety of French chalk. Characteristic specimens from the upper cutting as-

the cutting ends with a mass of soft earthy aluminite. Prospects were obtained in every part of the cutting, with the exception of the siliceous earth. Good prospects were found in varieties of materials which miners would generally consider most unpromising.

Down the hillside, to the north, west and south, a similar deposit is everywhere met with; a frothy or spongy matrix, sometimes aluminous and sometimes siliceous, generally iron-stained and occasionally associated with large masses of red and brown hematite; but gold has as yet only been obtained from a few places away from the hilltop, though naturally there has been considerable prospecting wherever the formation resembled that of Mt. Morgan. Perhaps the deposit on the slopes is more aluminous and less siliceous, and contains less of iron oxides than on the hilltop; but these are the chief differences, and the formation has evi-

from which the spring was fed. The gold, and to some extent the iron, may have been dissolved out of the iron pyrites of such ledges as the Mundic reef, seen on Mundic creek; the gold possibly by chlorine produced by the contact of hydrochloric acid, derived from the decomposition of chlorides with manganese, which occurs sparingly in the form of pyrolusite along with the ironstone in Mt. Morgan. The deposit left by the thermal spring is evidently newer than the altered stratified rocks through which it hurst. In the presence of so much ironstone a precipitate for the gold need not be far to seek. Protoxide of iron was probably present in sufficient quantities to perform this important function, but it may have been aided by tannic acid derived from vegetable matter accumulated in the basin. Precipitation of the gold by tannic acid would accord better with the confinement of the gold to the basin or center of Mt.



PLAN SHOWING POSITION OF MOUNT MORGAN GOLD DEPOSITS.

its argillite or olivine), rhyolite and other igneous rocks; the intrusive masses apparently occupying as much space as the remnant of the original stratified formation itself. The country rock is traversed by ledges of the ordinary description, several of which contain gold.

Mt. Morgan itself, as described in the previous articles, contains gold in a very unusual—or quite unprecedented—formation. The form of the latter will be best understood by reference to the accompanying sketch, made from a plan based on surveys by Mr. T. Byerly, accompanying Government Geologist R. L. Jack's report.

Aneroid measurements give Mt. Morgan an elevation of 1225 feet above sea level. The mine is at the summit of the mountain, and is approached by a rather steep road. The work is carried on in two quarries or faces, one of which (No. 1) is designed to remove the top of the mountain, to pass it through the stamps, and the other (No. 2) to attack the auriferous quarry 100 feet below.

The central portion of the upper cutting is a large mass of brown hematite, generally in

sayed from four to six ounces and up to 10 ounces of gold per ton.

The shading on the plan corresponding to the lettered blocks represents the following: B, deposit of basin of hot spring; D, deposit of overflow from hot spring; M, metamorphic rocks; R, rhyolite dykes.

The lower or magazine face (No. 2) presents a sort of fanlike arrangement of its various materials. In the center is a hard (almost vertical) deposit of brown hematite in large "horns," with a mammillated botryoidal or sometimes reniform appearance. To the right (east) is a nearly vertical deposit of aluminous iron ore, followed by a mass of red hematite or large cellular bombs. To the east is a broad mass of loose iron-stained siliceous and aluminous material, which begins to lean eastward, like the outer feathers of a fan. A great mass of loose earthy hematite, another of brown hematite, weathering to iron-ore, another of red earthy hematite, and another of brown hematite in large ton blocks appear in succession, as the cutting is followed east. Near the east end of the cutting is a fine white siliceous earth, and

dently ore origin throughout.

After a careful study of the whole formation Mr. Jack came to the conclusion that nothing but a thermal spring, in the open air, could have deposited the material under consideration. The frothy siliceous sinter agrees in every respect with the deposits of New Zealand and Iceland geysers, and of the still more wonderful hot springs of the Yellowstone Park. The frothy and cavernous condition of the siliceous sinter of Mt. Morgan may be accounted for by the escape of steam while the silica was yet (after the deposition in the evaporation of the water) in the gelatinous condition so frequently observed in the deposits of hot springs. The aluminous silicates represent the familiar outbursts and flow of mud. The iron oxide appears to have been deposited in some cases along with the silica and alumina, and in others to have been deposited later. In some cases it may have been originally pyrites, as it now and then occurs in cubical hollows. Calcareous sinter is very common in siliceous springs, and its absence from Mt. Morgan must needs imply the local absence of limestones among the rocks

Morgan than precipitation by ferrous oxide and the occurrence of vegetable matter in the basin of hot springs is not uncommon.

THE tendency of silver in London is upward. The cause of the improvement is attributed in part to a refusal of the Indian Council to accept bids for drafts at the then current rates. The lowest quotation on record is 44½ pence per ounce, which was made about three weeks ago. On Wednesday, May 12th, the Indian Council met and allotted drafts at the lowest rate ever accepted for Government exchange in India. The quotations dropped from 45½ to 44½ in three days. The refusal of the Indian Council to accept bids of the lowest figure caused a marked improvement.

CABLE SUITS DISMISSED.—The several cases against the Market, Sutter, Presidio and Clay Street Railroad Companies instituted by the Cable Railroad Company, and which have been pending in the United States Circuit Court for several years, have been dismissed by stipulation.

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Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated:

General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulae Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated, and Expressed in Formulae and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water through Short Tubes and Compound Tubes; Flow of Water through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficients for Round, Circular and Angular Flow through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

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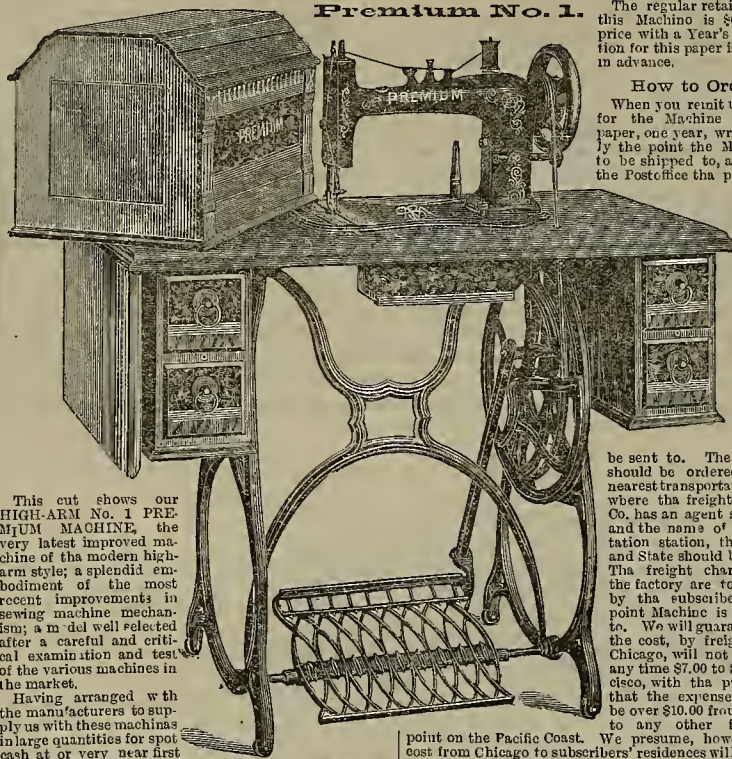
An illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the heading of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ore, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the heading of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroehnke's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

Speaking of amalgamators the author describes a

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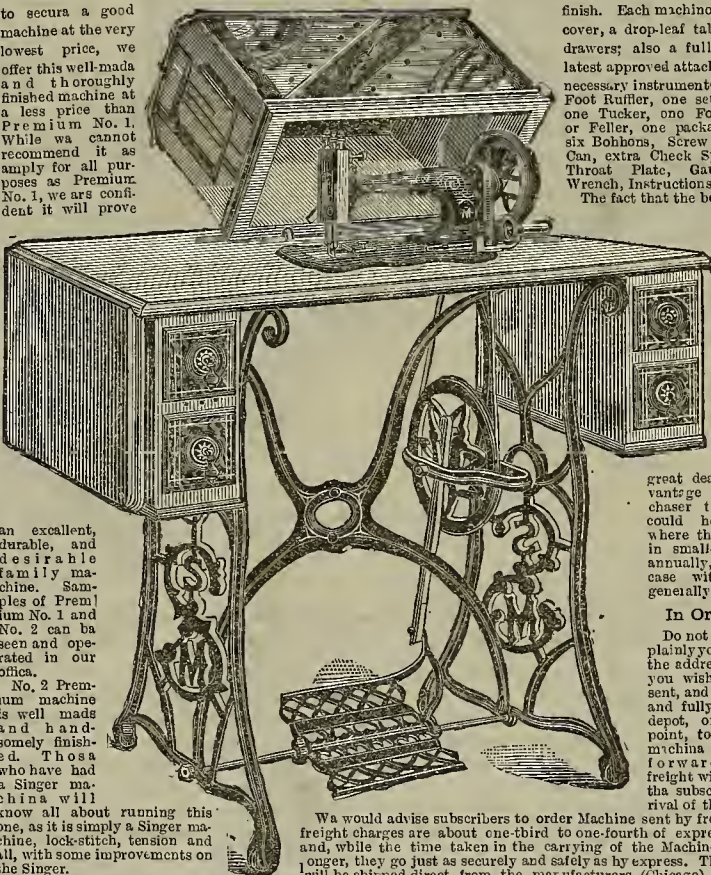
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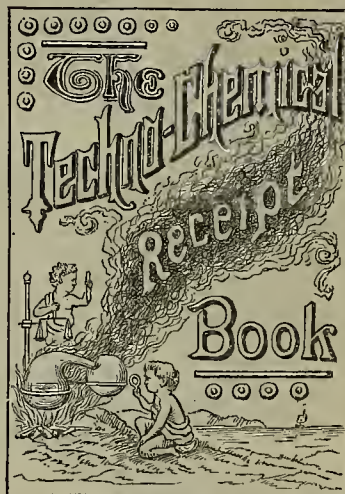
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The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. This question can often be answered gratuitously by us, immediately on receiving full information of the invention, by reason of our long and extensive practice as patent solicitors and editors and publishers of first-class, scientific and industrial journals, during the past 20 years and over. When the question of priority of invention is not so readily to be determined, it is generally best to make what is termed a "preliminary examination," by searching through the patent office reports among the patents in the class to which the invention relates, and referring to our extensive patent library, containing compilations of special classes of American and foreign inventions, mechanical dictionaries, scientific encyclopedias, files of scientific and mechanical newspapers, and an immense number of patent applications by inventors of the Pacific coast, carefully filed by this office since 1860.

If, by this "preliminary examination," the improvement is found to have been previously invented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely whereby his invention has been anticipated, thereby saving him further expense and perhaps much time, useless delay, anxiety, etc.

To avoid all unnecessary delay, however, in securing patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately, and forwarded to the inventor for his signature. When the inventor receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps to be taken.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$30 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give a case up as long as there is a chance to obtain a patent. The agency charge is from \$25 to \$30, or sometimes more, if the invention is intricate or complicated, or requires much labor. Drawings cost from \$5 upward, according to their number and the time employed, and, if a model is sent, the express charges upon this and the papers must be added. The total cost, in addition to Government fees, rarely exceeds \$40, and for this we do all we can without appealing the case.

When the invention consists of a new article of manufacture, or a new composition, samples of the separate ingredients sufficient to make the experiment, and also of the manufactured article itself, must be furnished.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are considered more satisfactory to the Patent Office than the old and more cumbersome system of storing up an immense bulk of almost numberless models.

Drawings or sketches, sufficient to illustrate clearly the invention, with a sufficient description to enable us to make a full set of perfect drawings for the Patent Office is all that we require. A model will answer our purpose as well however, in cases where the inventor can more easily furnish it for our use.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or very poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention while in reality it may be of great value, and would meet with ready sale had the invention been fully portrayed by artistic and skillfully executed drawings. Again, when patents of this character are brought into court, the uncertainty and ambiguity of the drawings enable the opposing experts to mystify the judges as to the construction or combination of parts intended to be covered by the patentee. In all cases prepared by us, the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken that the invention is fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

In the Patent Office

The application is assigned to the Examiner having charge of the class to which the invention relates. The case must then take its turn with others in the order of filing, and in due time is carefully examined to test the novelty of the in-

vention. If the examiner fails to find anything that anticipates the invention, a patent is immediately allowed, provided the specifications and claims are drafted in proper form. Should the Examiner find a prior patent which, in his opinion, anticipates one or more of the claims in the application, a letter of rejection is sent to the attorney in charge of the case; and, if the attorney coincides with the views of the Examiner, the claims rejected are erased. In preparing applications for patents, an attorney should be careful to familiarize himself with the class of inventions to which the application pertains, so that the specification and claims may be drafted as nearly perfect in the first instance as is possible. This course saves much time in prosecuting the application to a patent.

When claims are improperly rejected on patents which do not anticipate the spirit or wording of the claims, proper steps are immediately taken to convince the Examiner of his error. This is done, in most part, by personal arguments, as the differences in construction, operation, function and results are more readily discovered and appreciated by an oral presentation of the facts than can possibly be done by relying solely on written arguments. In order that the Patent Office record of the patent be complete, an oral argument is generally supplemented by a manuscript brief, that others, in examining the files at any future time may clearly comprehend the position taken by the Examiner and attorney in prosecuting the case to a patent.

In addition to our own personal attention to the interest of our clients here, we have, for over 12 years past, had constantly in association with us in Washington, one of the soundest legal counselors and ablest of practitioners in patent business in this country, who carefully attends in person to our business at the Patent Office, and has attained success in a most marked degree.

Perfect Claims.

The value and force of a patent are dependent on its claims. A patent may disclose to the public the most important and valuable invention, and yet the claim be of such meager scope that the patent is actually worthless. When the claims of a patent are so loosely drafted that infringers can flood the market with improvements, differing from the improvement disclosed by the patent only in slight changes in construction and arrangements of parts, such a patent is valueless to the owner, as it fails to afford him that exclusive and complete protection guaranteed by the Patent Law. Hence it is that the greatest care, skill and perseverance are required, first, in properly drafting the claims in the first instance, and second, in prosecuting the application before the Patent Office, and maintaining the rights of the inventor to claims as broad and sweeping as the invention will warrant. This latter is no easy task. The Examiners of the Patent Office serve in the capacity of attorneys guarding the interests of the public. It is their sworn duty to exercise the greatest care and watchfulness, that patentees do not secure claims of greater scope than they are justly entitled to. It is but natural that Examiners are sometimes in error as to just what scope should be accorded an invention. Although the Examiners act under honest convictions in cases where they refuse an inventor his just rights, yet it is the duty of the attorney to maintain the claims of his client, if he is convinced that they are just and proper. To succeed in this requires the display of tact, firmness and ability; and when the Examiner is made to see that the inventor is honestly and fairly entitled to the claims which have been rejected, he will almost invariably recede from his former action, and allow the case.

Advantages to Inventors on the Pacific Coast.

The firm of DEWEY & Co. (continuously editors and publishers of the MINING AND SCIENTIFIC PRESS, nearly from its early commencement in 1860) offer comparatively far better facilities to the local inventors of the Pacific States and Territories than are possessed by any other agents in America. Members of the firm give personal attention to the applications entrusted to their care. They have been longer in practice in patent soliciting than most agents who are still personally engaged in the business. They have secured more U. S. and foreign patents in the past 20 years (with very few exceptions) than any other firm still existing. Their practice has been so successful and long continued, that the great majority of inventions on this side of the American continent have been patented through their agency, thus affording them great and valuable experience, by thorough information of the true principles and points of novelty in the inventions, whether general in character or peculiarly local to this coast.

The extensive business combination and experience of this firm is undoubtedly one of the most fortunate in existence for affording inventors prompt and reliable advice, and the best possible facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation that is best calculated to widely inform the class of readers most specially interested in the subject of his invention.

Saving of Time, Etc.

Inventors on this coast will find that owing to our familiarity with inventions and local affairs of this coast, we can more readily and fully comprehend their wants, and thus save much of the time ordinarily consumed in preliminary writing back and forth when distant agencies are employed.

Caveats.

A caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is that it entitles the caveator to receive notice, for a period of one year, of any application for a patent subsequently filed, and which is adjudged to be novel, and is likely to interfere with the invention described in the caveat, and the caveator is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from \$10 to \$20. The Government fee is \$10 additional.

To enable us to prepare caveat papers, we only require a sketch and description of the invention.

Rejected Applications.

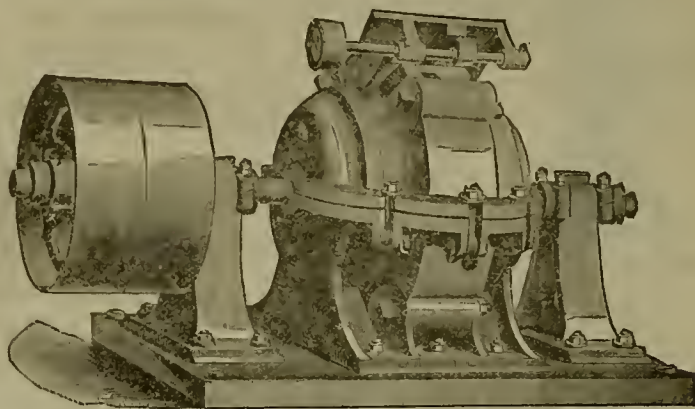
Inventors who have rejected cases (prepared either by themselves, or for them by other agents), who desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

Inventors who do business with us will be notified of the state of their application in the Patent Office, when it is possible for us to do so.

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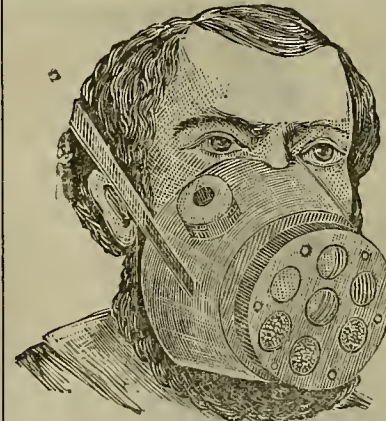
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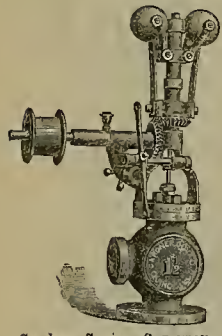
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The Mundy Patent has been sustained in the United States District Court of New York against the Ledgerwood Manufacturing Company, and also in the District Court in the State of New Jersey against Kendall & Roberts for infringement. Therefore all parties are cautioned against making, using, or selling Friction Drums that infringe this patent.



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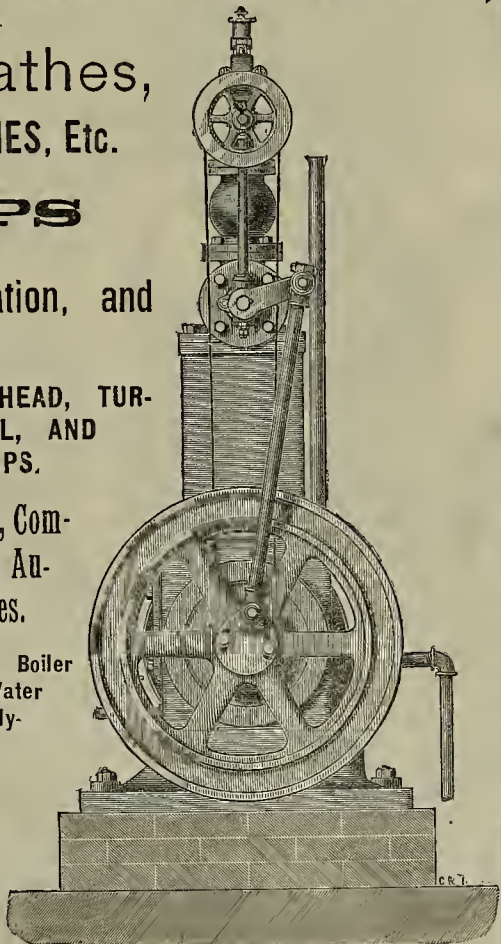
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Concentration and Chlorination in Nevada County, Cal.—No. 4.

[Written for the Press by C. A. SCHENCK.]

The Furnaces.

The roasting is performed in two elliptical furnaces, having one chimney in common, divided by a partition. Each one has three floors or hearths, one above the other. The upper or third floor is not covered by an arch, and is only used to finish the drying before the ore is introduced to the middle hearth, where the roasting process begins. There is room for about five tons on this upper floor, so that the layer is from four to five inches thick. By means of two drop-holes in the arch of the middle hearth, the ore is conveyed to the floor of the latter. This hearth is provided with three working doors—ones at the end of the long axis of the ellipse, the other two near the opposite end, so that the chimney stands between them. From the middle hearth one drop-hole only leads to the lowest one, which is provided with four working doors; the fire-place is on the chimney side of this lower hearth, and occupies part of the elliptical area of this floor. Four holes, through which the roasted ore is dropped, lead from this floor into arched ways in the lower masonry of the furnace.

A distinguishing feature of this roasting furnace is the solid iron binding, besides its elliptical form and the three-hearth system. A charge of roasted ore, about two and one-half tons, is drawn every 12 hours—one at 2 P. M., the other at 2 A. M., whereupon one-half of the ore on the middle hearth is dropped on the floor beneath, which has been made ready for its reception by the previous discharge. The drop-hole from the middle floor being near the one work-door end, the workman works now from this side, till one-half has been transferred to the lower hearth; then he goes around to the second work door end of the middle hearth, and pushes the remaining one-half with his hoe over to the opposite side, having previously closed the drop-hole. By this operation he has made room for two and one-half tons of dried ore from the uppermost hearth, which, in coming down, forms two dark-looking conical piles, which he spreads out in an even layer on the empty floor, between short axis and two work-door ends. Then he goes down to the lowest hearth to spread out the pile on this floor. During all this time some of the work doors have been by necessity left open and he has to fire up, whereupon the ore on the lowest hearth soon gets red hot, and the sulphur of the ore on the middle floor begins to burn with the characteristic blue flame.

During the meantime another workman has transferred to the drying floor as much ore as was dropped to the middle hearth.

Working the Charge.

It can be easily seen from this description that the ore on the middle hearth is in two different stages of roasting; the first half of the charge near the one work-door end being 12 hours ahead of the other half, so that the first-mentioned portion of ore, when it is advanced far enough to be soon discharged to the lowest hearth, shows only very few sparks and almost no burning sulphur, when it is worked with the hoe; it is also less woolly in appearance than the other portion on the same middle floor, which is 12 hours behind, and does not run so much from the hoe as if it was wetter, when the hoe is passed through it, which the other less advanced portion shows in such a remarkable manner, showing besides pale blue flames of burning sulphur and sparks in profusion.

At about 4 A. M. (and 4 P. M.) salt (from one-half per cent) is charged to the red hot ore on the lowest floor and diligently worked into it with the hoe. White vapors arise in profusion and the sky-blue flame of the chloride of copper is also noticed off and on. If at last the salt is well worked into the ore the latter is piled up in one heap, which extends from the flue to the bridge, in which state it is left a couple of hours and then spread out again over the whole hearth to be raked from time to time (about every 15 minutes) till 12:30 P. M. and 12:30 A. M. respectively, when it is banked up in four piles to be discharged at 2 P. M. (2 A. M.). The discharged ore forms a conical pile on the floor, and is allowed to cool off before further handling, during which time the process of chlorination

continues. This temperature on the lower hearth is not allowed to sink much below red heat; sometimes it rises to light red; whereas on the middle hearth it is quite different, on which a slow increase of the temperature is most advantageous. Besides from the heated gases from the lower floor, heat is derived here from the burning sulphur; but this latter source decreases continually as the ore advances in roasting, so that it happens that the more advanced charge on this floor looks almost dark on its surface, while a charge, which in time is 12 hours behind, is dark red and shows pale blue flames of burning sulphur.

The furnace is provided with the usual means for regulating the heat; it consumes about 1½ cords of wood in 24 hours.

The lower hearth surface is about five-sixths of the area of the middle and upper floors, the other one-sixth, being occupied by fire-place and bridges. For this reason, and also on account of the ore receiving here the finishing roast, which latter circumstance permits only the handling of smaller quantities, the lower hearth can only be charged with about half the ore on the middle and upper hearths. This explains at the same time the fact that one-half of the ore on middle floor is 12 hours ahead of the other half. In practice it has been found of advantage to leave a space free of ore, which extends from the fire-bridge about one foot into the furnace.

Well-roasted ore is of a dull grayish-blue color. It should not feel gritty to the touch, but soft like flour (making allowance for the sand mixed with it). The workman uses the following test to satisfy himself about his work: A shovelful of the roasted ore, shortly after discharge, is spread out in a thin layer on the brick floor; if it burns gradually into reddish-brown he considers the ore well roasted.

A Reverberatory.

Besides the three-hearth elliptical furnace of the Providence M. & M. Co., another one of different construction is extensively used in the district—a reverberatory which is from 60 to 70 feet long and divided by a step into two floors, so that the upper floor lies in the extension of the lower, only 12 inches higher. The dimensions of the lower hearth are 17 feet from fire-bridge to the flue which leads to upper hearth, and 10 feet across. It has no auxiliary fire-place for the upper hearth, which, considering its length, a great many might think would be needed. During the long passage of the concentrates from upper end down to the fireplace, the roasting is very gradually done, so that the work in this furnace is considered to be very satisfactory. About three tons of roasted ore are obtained in 24 hours, consuming one cord of wood in this time. It needs two workmen at a time to run this furnace, whereas one man can do all the work around an elliptical furnace.

New Pulverizing Mill.

Robert Forbes, of Downville, Sierra county, has just obtained through the MINING AND SCIENTIFIC PRESS Patent Agency a patent for an improved pulverizing mill of that class in which an eccentrically moving or "wabbling" muller operates in an annular space in a pan or vessel and around a central guiding core.

The pan or vessel has sloping sides and a central conical core by which is formed an annular or ring-shaped space, on which are seated the removable dies. Sectional screens are secured to and continue the inclination of the pan. On the rim of the pan is an exterior flange under which is an annular discharge trough set on an angle.

The muller is made of an annular shape and provided with shoss. The muller is received by a spider to a shaft, the upper end of which is eccentrically connected with a crank-shaft whereby the muller has imparted to it a wabbling or eccentric motion within the pan and around the central core. The muller is provided with a hopper, and over the edge of this, and fitting snugly upon or within the top of the screen, is an annular shield. This shield is made preferably in the shape of a truncated cone, its central opening being somewhat smaller than the diameter of the upper portion of the hopper, whereby all liability of the ore between the screens and the muller is avoided.

Around the central core is an annular shoe, which may be readily put in place or removed. On the inner surfaces of the muller-shoss are

wearing blocks which are adapted to be renewed when necessary. The screen sections are secured to the pan in a peculiar and effective manner.

The operation of the machine is as follows: The annular muller fits down into the annular space of the pan, and the material to be crushed is fed into the hopper of said muller and passes down through it, finally working its way between the shoes and dies. The shield, by extending over the hopper, prevents any material from getting down between the periphery of the muller and the screen-sections. The muller is given a "wabbling" motion and is guided in this motion about the central core of the pan.

As considerable wear occurs between the inner surface of the muller and the central core, it is necessary to provide the latter with a shoe of some kind. This has been done heretofore by independent blocks, which are separated from each other and serve also to center the muller. Mr. Forbes has found that in using said blocks the material is apt to get between them in rather large pieces which are not crushed. He has, therefore, discarded the blocks and uses a continuous-ring shoe, such as described, which effectively protects the central core, guides the muller as well, and acts as a perfect crushing surface. The wearing blocks on the inner surfaces of the muller shoes provide for the wear on this portion of the muller, which takes place between the shoes and the central core.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 262 Market St., S. F.

FOR WEEK ENDING MAY 25, 1886.

342,418.—BUTTON HOLE ATTACHMENT FOR SEWING MACHINES—E. O. Bennett, S. F.
342,566.—TRACK CLEARER—L. J. Bergendahl, Pendleton, Ogn.
342,572.—PROPELLER FOR VESSELS—W. L. Boyer, S. F.
342,596.—PULVERIZING MILL—Robt. Forbes, Downville, Cal.
342,435.—ORE CONCENTRATOR—W. A. Frank, Final, A. T.
342,393.—FIREARM—Thos. Kelly, S. F.
342,616.—RAIN WATER FILTER—B. Leggett, Tucson, A. T.
342,453.—CULTIVATOR—Neil McLean, Watsonville, Cal.
342,467.—VELOCIPEDE—C. T. Ryland, jr., San Jose, Cal.
342,644.—GRAIN SOWER—W. Sharkey, Oroville, Cal.
342,768.—PADDLE WHEEL BUCKET—Trullinger & Scott, Astoria, Ogn.
13,335.—TRADE MARK—Knappion Packing Co., Oakland, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

VALVE GEAR.—John B. Pitchford, assignor of one-half to Wm. T. Garratt, S. F. No. 342,835. This invention relates to certain improvements in the means for actuating the valve gear of engines. It consists in a novel manner of constructing cams, and in their application for the working of the valves of steam engines, so as to cut off the steam either at a fixed point in the stroke or at one which is automatically variable.

CAR COUPLING.—Frank Miller, Olema, assignor of one-fourth to U. M. Gordon, San Rafael, Marin county. No. 342,028. Dated May 18, 1886. This car coupling consists in oppositely located spring-actuated drawheads of peculiar construction, a novel pivoted or swinging hook in each drawhead, a spring-actuated lock-bar for each hook, and means for withdrawing the lock-bar. This car coupling is automatic, and the release can be effected without going between the cars.

CULTIVATOR.—Neil McLean, Watsonville. No. 342,453. Dated May 25, 1886. This cultivator is one which is especially adapted for orchard use. It consists of a frame comprised of two or more parallel timbers, having teeth fixed to it, so as to present their points transversely to one side of the frame, an open based triangular frame attached to one end, with the apex toward one side and anti-friction rollers set within it, wheels mounted upon a cranked axle extending centrally across the frame, and a means for raising and lowering the frame about these wheels, a hinged swinging wheel attached to the front end of the frame, with

means for attaching a team thereto. The device is specially intended for cultivating the ground in orchards and around trees in which the branches hang low and extend outward so far that it would be impossible to cultivate close to the trees, by reason of the side draft of a cultivator constructed with an extension to one side for that purpose.

IRONING MACHINE.—Constant Wolff, S. F. No. 341,980. This relates to the class of machines for ironing small articles of clothing, more especially collars and cuffs. A cors is first heated and is then placed in an iron having a flat surface, and the lid is closed. The article to be ironed is placed between the roller and the flat bottom of the iron, and a treadle is pressed so the iron and the roller are brought together with the requisite degree of pressure on the article. The crank of the roller-shaft now being turned, the article is fed through under the iron.

PISTON ROD AND VALVE STEM PACKING.—Charles Wetson, S. F. No. 341,973. Dated May 18, 1886. This is an improvement in packing for piston-rods and steam-valve stems or other rods which reciprocate through a joint which will be exposed to steam or vapor under pressure. It consists of a set of spring-actuated packing-rings fitted at either end of the stuffing-box gland and in combination therewith; of an intermediate ring of greater width fitted to the rod, and in certain details of construction.

ENGINE VALVE GEAR.—John B. Pitchford, assignor of one-half to Wm. T. Garratt, S. F. No. 342,036. Dated May 16, 1886. This invention relates to a mechanism for operating steam valves, and more particularly to the non-detaching cut-off valve gear applied to engines of the Corliss type. It consists of an equalizing lever suspended and swinging from a point near the middle upon a pin on the arm that imparts motion to the rotary or Corliss valve, in combination with an intervening mechanism, consisting of an arm, hall-crank or disk, and a swinging link or lever connected to an eccentric controlled by a governor.

VELOCIPEDE.—Claus T. Ryland, Jr., San Jose. No. 342,467. Dated May 25, 1886. It consists of a single large wheel having a seat and operating mechanism supported from the axle within the wheel, two smaller tillers or steering wheels with a connecting frame by which they are supported just outside the rim of the main wheel, a ratchet mechanism for driving the main wheel, and pedals connected therewith, a hollow shaft with rods by which the back and steering mechanism may be operated and jointed spokes in the main wheel which may be separated for the ingress or egress of the rider.

Mining Share Market.

Mining stocks continue dull. The sinking of the combination shaft deeper has been the principal feature in the deep developments of the Comstock during the week. About 24 feet per week is the regular rate of sinking progress. The shaft has reached the 3200 level. This certainly is an important era point in the mining history of the world. This shaft is now 3200 feet in perpendicular depth from the collar or surface of the shaft to the bottom, perfectly straight, so that a stone dropped from the center of the shaft at the surface would strike the center of the bottom. Mining has been carried to a very little greater depth in the world, or even on the Comstock, but, as before remarked, the Combination shaft is to-day the deepest perpendicular or vertical shaft anywhere in the world. It will be continued 60 feet deeper for a sump or drainage well for the pumps to operate from, and further sinking probably discontinued until the present lowest levels are thoroughly explored.

As soon as practicable a station will be opened at the 3200 level, and a lateral drift started north to connect with the drift now coming south from the Hale and Norcross deep winze, 3200 level. The bottom of this shaft having cut into the main Comstock ore channel, as was expected, owing to the regular dip of the vein, about 45 degrees to the east, all deeper sinking of the shaft will be all the same as crosscutting the ledge toward the west or foot wall; but when the station is opened on the 3200 level it will be on the west side of the shaft, and a drift or crosscut west is to be started from it directly through the vein to the west wall, the lateral drift to the Hale and Norcross deep winze being run at the same time. Some very effective and decisive prospecting explorations of the deepest Comstock workings at this point will be done during the next month or two, and work of very important interest in the future hopes of the great lode.

THE MINT.—The annual clean up at the Mint will commence on the 12th inst., and after that date no base hullion will be received. Refined bullion will be accepted until the 19th inst.

THE electric road through First street to the summit of Boyle Heights, Los Angeles, is an assured fact, the rails being on the way.



1850. 1885.
RANKIN, BRAYTON & CO.,
...BUILDERS OF...
MINING MACHINERY.

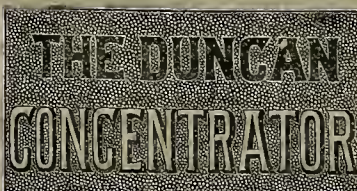
San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPS, ETC., ETC., of any DESIRED CAPACITY.

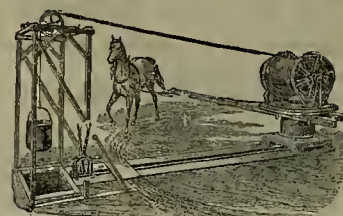
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



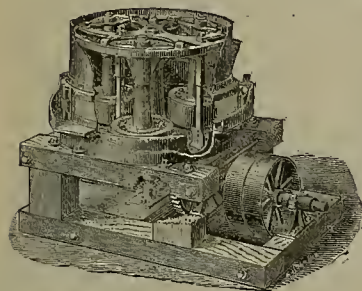
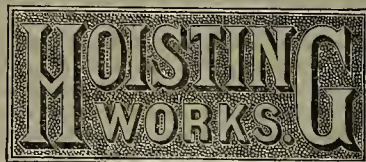
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH of the YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 800 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 600 feet of five-eighths steel rope. SEND FOR CIRCULAR.

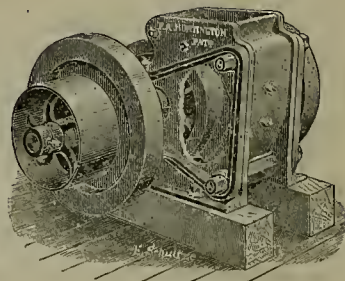


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F. A. HUNTINGTON,
MANUFACTURER OF
Centrifugal Roller Quartz Mills,
CONCENTRATORS AND ORE CRUSHERS,
Mining Machinery of Every Description,
Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

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MANUFACTURERS OF

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It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

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THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

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FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

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SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

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IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

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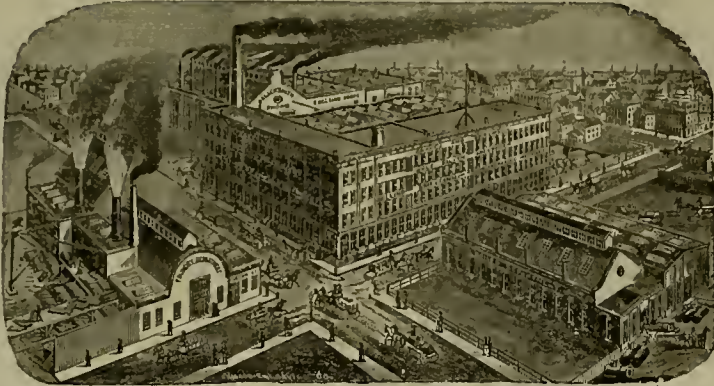
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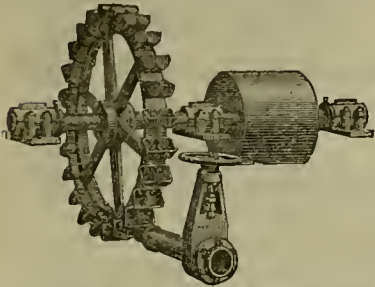
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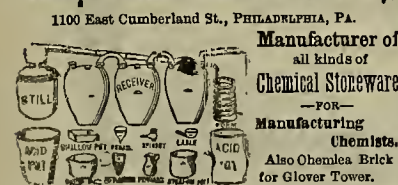
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THE SCIENTIFIC PORTABLE FORCE AND BLACKSMITH HAND BLOWERS.



GUARANTEED
The Lightest Running! The Strongest Blast!
The Most Durable!

ADAPTED TO ALL KINDS OF WORK,
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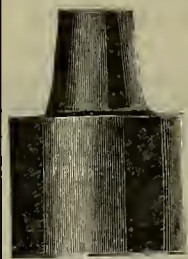
The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

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Mines Examined and Reported on.
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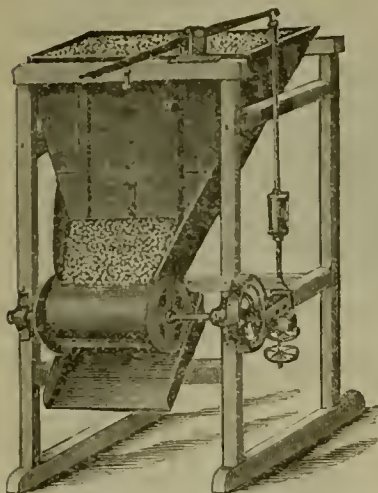
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Will attend to business in connection with mines in Sonora or Arizona.

THE ROLLER ORE FEEDER

[Patented May 23, 1882.]



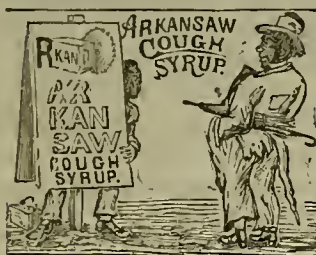
This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repair.

Golden State and Miners' Iron Works.

Sole Manufacturers,

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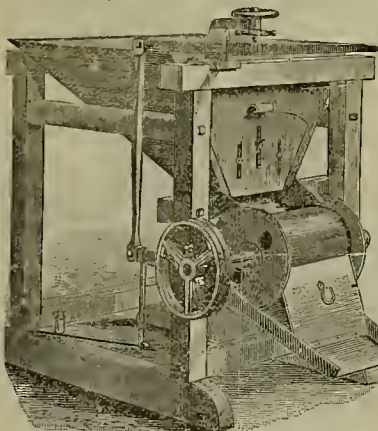
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Do you want a sure, safe and reliable Cough Syrup? Are you troubled with a Cough, Cold, Bronchitis or Lung Complaint? Do your Babies keep you awake all night with Hacking Coughs, Colds in the Head, etc. Do you want something reliable in the house to meet these emergencies? We answer to all: "Go to your Druggist and get a Bottle of the Arkansas Cough Syrup, and be troubled no more." Price, 50 cents per Bottle!

FOR SALE BY ALL DRUGGISTS.

THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



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Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ore; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
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QUARTZ BREAKERS!

—AND—

Pulverizers Combined.

To Run by Hand or Power.
Mining Machinery of Every Description; Drawings, Plans and Specifications.

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DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY is the oldest established and most successful on the Pacific Coast. No. 252 Market St. Elevator 12 Front St., S. F.

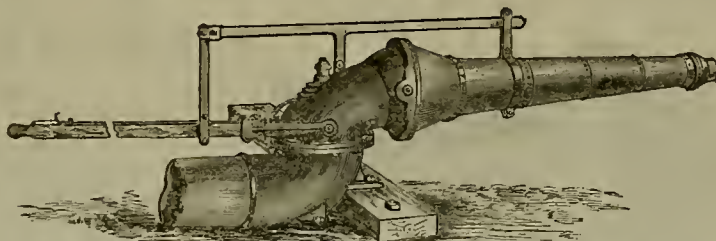
BISHOP'S PATENT ELEVATOR,
FOR HANDLING BAGS OF GRAIN.

Address: 11 Stevenson Street, San Francisco.



With this elevator two men can elevate from 500 to 600 sacks of wheat in one hour from a warehouse floor to the top of the pile, 20 sacks high. It elevates every sack high enough to run them by a chute to any part of the pile, thus saving the labor of carrying. It saves the labor of four men to each pile. The elevator will raise sacks up to the tie beams of any warehouse, the machinery working under the beams. An ordinary laboring man will elevate 500 sacks per hour, and will do this labor with more ease than he could handle one end of each sack in the usual way. Two men will raise four sacks in the same time they raise one with the old style machine. This elevator is mounted on patent casters, making it perfectly portable over any warehouse floor, and can be secured at any place by a few turns of four spiral screws in the frame. It is always ready for use, without adjustment or change in any of its parts. All warehousemen who have seen this machine at work say it will save its cost in 30 days' use. It is well and strongly made, and with, with care, last from 15 to 20 years. It weighs about 400 pounds. These machines are guaranteed to do all claimed for them, if they are properly handled. On a single trip through Traver, Fresno, Merced, and Turlock, from one to three of these elevators were sold in every warehouse visited. In ordering machines, give light in feet and inches from the warehouse floor to the under side of the tie beams, and allow a few days' time for fitting up machines, which has to be done to suit orders.

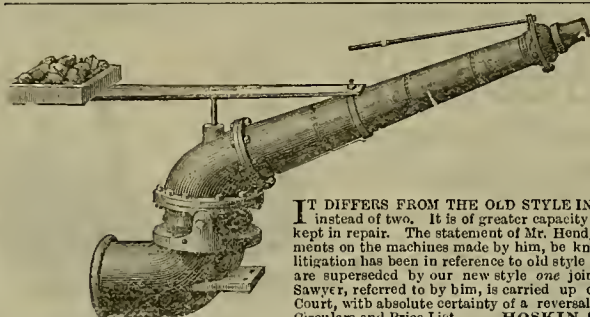
IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Patents furnished upon application to

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This cut represents our

IMPROVED
HYDRAULIC
MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOCCING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.

W. E. CHAMBERLAIN, JR.

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Ladies admitted into all departments. Day and Evening Sessions during the entire year.

Call, or send for CIRCULAR to

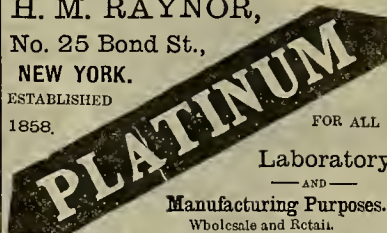
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—AND—

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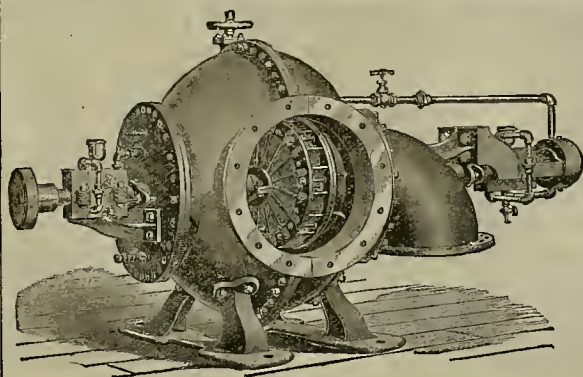
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A Good Opportunity for a Machinist.

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic.

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Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers,

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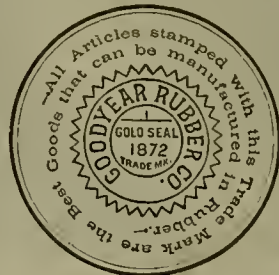
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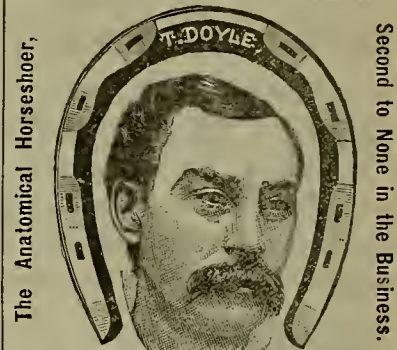
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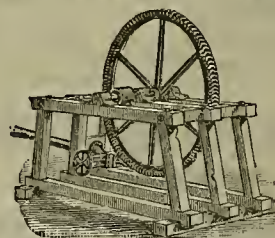
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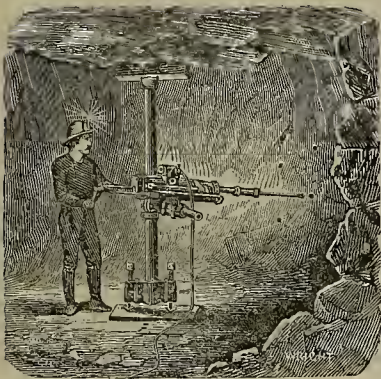
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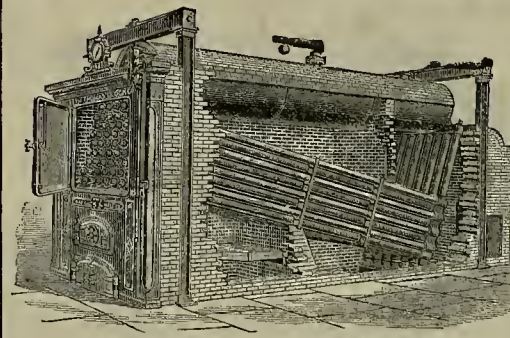
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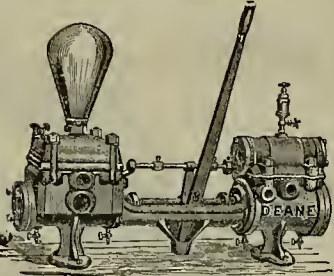
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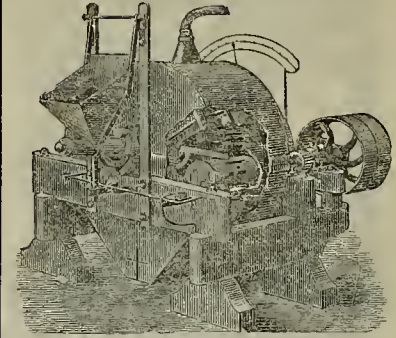
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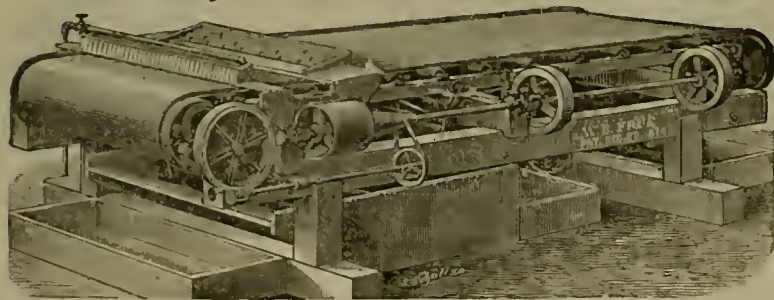
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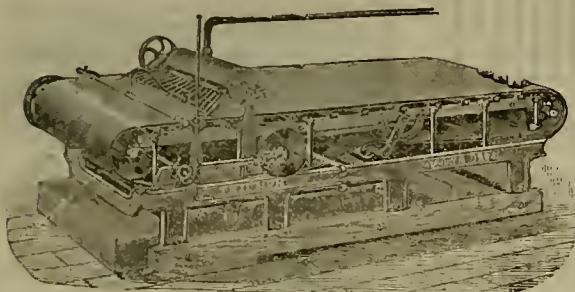
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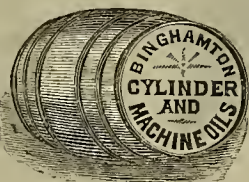
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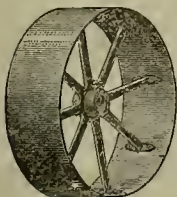
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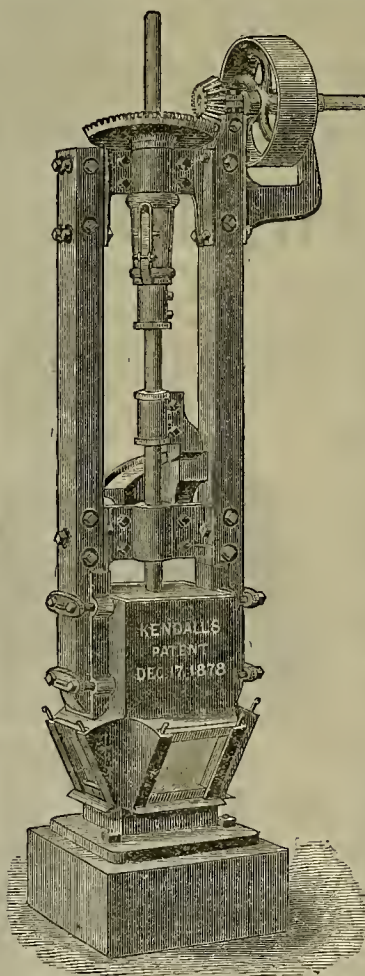
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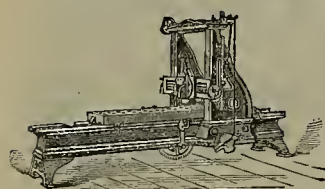
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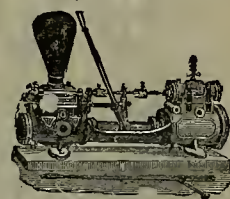
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CENTRIFUGAL PUMPS,

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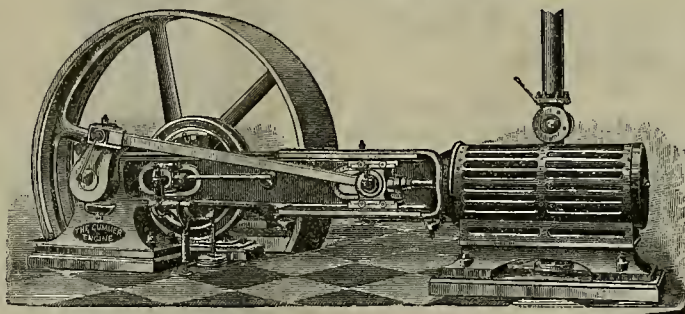
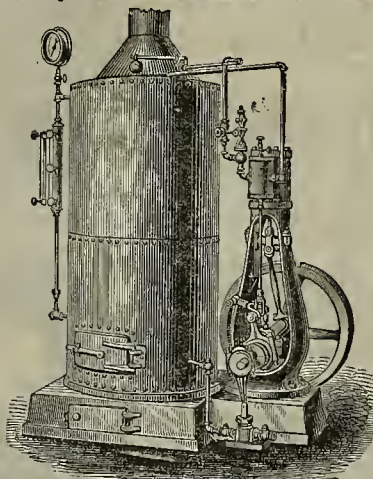
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JUNE 12, 1886.

VOLUME LI.
Number 24

The Baragwanath Steam-Jacket Feed-Water Heater and Purifier.

It is a generally conceded fact among engineers that an efficient feed-water heater is one of the most important factors in the economical production of steam, and yet, excepting in the larger plants, but little attention comparatively has been given to this subject, even on this coast where fuel is much more expensive than at the East.

The heater shown in the accompanying cut has many features of special merit and is one of the best that has been produced. Upward of 5000 of them, it is said, are in use in the Eastern States, and among the references given are many of the largest manufacturing establishments in the country.

The first desideratum in all appliances of this character is to raise the temperature of the water to the highest degree possible before putting it into the boiler. The second, to cleanse it of all impurities so as to avoid the deposit of sediment and the formation of scale.

The latter is by all means the most important consideration, as it is a well-known fact that there is little water, when subjected to proper tests, that does not show impurities to a very considerable degree, which, if carried into the boiler, are most troublesome and destructive. It is a fact, however, not so well known, that impurities held in suspension in the water are not precipitated until the temperature is raised above the boiling point.

Prof. Chandler, of Columbia College, one of the most noted chemists in the country, in a recent report to the New York Central Railroad Company as to the best means of purifying water for use in steam boilers, says: "Water, when boiled, expels the free carbonic acid and causes the separation of the carbonates of lime and magnesia, and if conducted at a high temperature and under considerable pressure, results in the almost complete precipitation of the sulphates of lime and other impurities."

Special stress, it will be observed, is laid upon the necessity of boiling the water under pressure before the impurities can be thrown off.

This is claimed to be what is accomplished in the Baragwanath heater, and is the only one that has demonstrated the possibility and practicability of so doing. This heater, then, has the advantage of imparting to the feed-water the highest degree of heat that is attainable by the use of exhaust steam, with no back pressure on the engine, giving in this way the greatest possible economy in the production of steam; as also that by boiling it under pressure all impurities, that are so destructive to the boiler, are eliminated.

This heater is warranted in every case to put the water into the boiler above 212°, and in the majority of cases at a temperature as high as 220°. This is made possible from the fact that there is no loss of heat by radiation, the water being confined in a close cylinder and surrounded by a steam jacket.

Another feature of special importance is that the steam does not come in contact with the water, thus preventing condensation and loss of heat. Also preventing the grease from the engine cylinder being carried into the boiler, producing foaming, a most troublesome and dangerous condition, as all engineers know.

Authentic testimony is brought from many sources to the effect that by their use boilers are kept clean and free from scale, and the

water being put into them at so high a temperature, a saving in fuel is effected of from 20 to 25 per cent.

For breweries, wineries, laundries, canneries, hotels and all other establishments where a large

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THE BARAGWANATH JACKETED FEED-WATER HEATER AND PURIFIER.

amount of hot water is required, this heater would seem to be invaluable, from the fact that it delivers its water free from all impurities and with the greatest possible economy.

A. P. Brayton, Jr., 127 First street, has been appointed agent for the Pacific Coast.

THE Belmont (Nev.) *Courier* says: A revival in mining throughout Nye county is confidently expected. Mines that have long laid idle will soon be worked again for what is in them and not as a stock gamble.

Any person having had silver money can dispose of it at the mint for 96 cents an ounce. This is a good price considering the coin is nine-tenths fine. Bullion silver is bought by the mints at the price quoted by the London Exchange. Within the last few weeks there has been an unusually large amount of bad silver disposed of at the mint for the price mentioned. The money is packed in sacks and stored away. This is the only way in which mutilated coin can be got rid of by means of the Government.

Working Copperous Silver Ores.

Friedrich Ernst, of this city, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency a process for working silver ores containing copper for the purpose of extracting the silver therefrom. The ore is stamped or crushed in the presence of a hot aqueous solution of salt—such as sea-water heated—and the pulp is subsequently treated by amalgamation.

The copperous silver ore is placed in a battery with a quantity of hot salt water containing about three per cent of salt, such as common sea water. The hot salt water is used in the usual manner and instead of the fresh water commonly admitted to the battery. It may be prepared in any available way, though perhaps the least expensive would be to run the exhaust steam through a suitable condenser to heat the salt water, which should preferably reach the boiling point before being admitted to the battery. From the battery the pulp passes into the tanks to settle. It is then taken to the pans and amalgamated with quicksilver in the ordinary manner.

The essence of the process lies in the treatment of the ore with hot salt water, while still in the battery. The chemical action is as follows: The chlorine of the salt water forms, with a portion of the copper of the ore, chloride of copper, and with the silver it forms chloride of silver. The surplus copper acting on the chloride of silver precipitates the silver as native silver, and unites with the chlorine thus freed as chloride of copper. Thus the copper is entirely taken up by the chlorine, while the silver is left free. This is all done in the battery. Now, when the pulp treated reaches the amalgamating pans, the native silver, already separated, is easily amalgamated, and with little loss of quicksilver; while the copper which was in the ore, and which would also have been amalgamated and have produced a low-grade bullion, is prevented from amalgamating by its union with the chlorine. The result of this process is a bullion of 950 to 980 fine.

Of course Mr. Ernst is aware of the use of salt water in other metallurgical processes, and even in amalgamating pans; but his process is not to be confounded therewith, especially with the latter, for the presence of quicksilver in the pans essentially alters whatever reactions would be due to salt water alone; but by completing these reactions in the battery, and before the amalgamation, he frees the silver entirely, so that it may readily be taken up by the quicksilver.

He knows also that both hot and cold water have been introduced into the battery, and that carbonate of soda and some other reagents have been used, which effect a precipitation of the precious metals; but these have no application to this process, which is simply for the treatment of copperous silver ores by the introduction of hot salt water while the ore is being ground.

CAPTAIN C. F. DUTTON, of the United States Geological Survey, will spend about two months at Crater Lake, Oregon, this summer, making explorations. The general character of the country will be ascertained and the depth of the lake will be taken by soundings.

In the statistics of the production of lead in 1885 the amount is given at 130,667 tons, or about 9000 tons less than in 1884.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Montana Mines.

The Camp at Cooke City.

(From our Traveling Correspondent, R. G. Huston.)

Cooke City mines are located in Gallatin county, Montana, 60 miles northeast of Cinnabar, the terminus of the National Park Branch Railroad, and are on the head waters of Soda Butte creek, a tributary of the East Fork of the Yellowstone river. The altitude is about the same as the Hecla Consolidated, at Lion City, ranging from 9000 to 11,000 feet above the sea level.

The town at the present time contains a population of about 600, many of whom are millionaires in prospect, as is always the case in mining camps. The ore here nearly all carries a high percentage of lead; but the silver product is undoubtedly the main profit to be derived from this camp, and unless our congressional "dads" conclude to extend a helping hand and pass a resolution to permit the extension of the Park branch of the Northern Pacific to Cooke, so that the mines and smelters may receive the benefits aggregating from cheap transportation of coke and in bullion out, the immediate prosperity of the camp will be greatly retarded. The 60 miles wagon transportation comes very high, and during the winter season is stopped entirely, making it only a summer season camp. Consequently, it is only on a par with the old-time placers, so far as steady employment is concerned. There are a number of influential parties, who are using their best endeavors with the "powers that be" to get the bill for the extension of the road through, and if they succeed the product of the Cooke City smelter and mines will bring her before the public in a favorable light, beyond doubt.

The Great Republic

Is probably the best known and the most developed mine of any in the camp, and is located on Republic mountain, one mile south of Cooke. The ore of this mine carries a high percentage of lead and an average of 125 ounces of silver with a trace of gold; choice rock running as high as 400 and 500 ounces silver per ton.

This ledge is an immense ore body, being 20 feet wide at the surface, and has thus far been mostly worked by open cuts and at no place deeper than 200 feet.

The company have a 40-ton smelter on their property, which, at the present time, is shut down, owing to running short in their coke supply before the wagon road was open, and they are utilizing the time in making some necessary improvements in their plant, putting in roasters and a concentrator. The operations of this company are under the able superintendency of Mr. Richards, formerly of the Richmond, of Eureka, Nev., who brings to the Great Republic Company a wealth of experience gained in the Richmond Company operations, and will, no doubt, prove a valuable acquisition to the company in their future operations in and around Cooke City.

The Black Warrior

Is located four miles west of Cooke and is another of the immense properties in this district, carrying a width of nearly 20 feet and bearing silver carbonates and galena in abundance. It is owned by Harry Gassett and Messrs. Rading, Black and Randal. These parties are operating the old smelter and are now actively engaged in making all the preliminary arrangements for a full summer's work. Their ore carries a large percentage of lead and about 75 ounces of silver average to the ton, making it a very profitable property to work, with cheap transportation to and from material and product.

The Home Stake

Is a name synonymous of a rich find, and from appearances will be fully borne out in this instance. It is located on Henderson mountain, four miles northwest from Cooke, and is at an elevation of 11,000 feet above sea level. This property is owned by Mather Bros., the Bank of Livingston and Messrs. Smith and Huston. This is a very large contact vein, having one granite wall and one porphyry. This is still another immense body, and is a well-defined lead carrying a general average of 100 ounces of silver per ton. It is developed by a large open cut and two tunnels. It is at present under a bond of \$100,000 to some Eastern parties who are represented by Mr. Meader, formerly part owner and general manager of the Montana Copper Company, whose mine and works are located at Meaderville, some two miles east of Butte. The fact that this mine has attracted his attention is sufficient evidence of its value, if age and experience count for anything in expediting a mining property, and they are busy extending developments on the mine. There is little doubt that the bond will be taken up at this expiration.

The Shoo Fly

Is located on Miller mountain, two miles west of Cooke, and owned by Messrs. Miller, Moore & Pease. It is about 10 feet in width and carries about 50 ounces of silver and a very large

percentage of lead. This property was bonded by Messrs. Gassett & Co. for \$21,000, to expire October 1, 1886, and they have been energetically operating it, running two shifts of miners on it all winter. The general impression is that they will realize more than double the amount of the bond before it expires. This is certainly a good way to buy property, but such results are phenomenal and probably would not do to rely upon in all cases.

The Yate mine is near by and is owned by John Yate, Mather Bros. & Fuller, and is really a fine prospect, assaying pretty high, and it is being rapidly developed by a tunnel run to strike the lead at a depth of 200 feet. They are expecting to reach the lead with this tunnel by June 1st. If the outlook is as good at that depth as on top, the property will be one of the best in the camp, and the lucky owners will have their hands full for the time in getting a plant to work it.

The Young America

Is on Henderson mountain, four miles northwest from Cooke City. It is a silver-bearing lead, showing also a trace of gold and a percentage of copper and lead. It shows a fine body of ore on the surface, and is owned by Frank Essler and Judge Luce, of Bozeman, who are having a large amount of development work done, having a tunnel in nearly 400 feet. The average prospects on the surface are about 100 ounces of silver. If they find as good average assays at the depth at which they will strike it with their tunnel as on the surface, their future prospects will be assured. The amount of money these gentlemen are investing in this development work certainly makes them deserving of success. In running their tunnel they have crossed three small veins of black sulphurets, assaying as high as 200 ounces to the ton, but they are still pushing on for the main lead.

The Stillwater is situated in the mouth of Wolverine Pass, some five miles west of Cooke. It is owned by Messrs. Dewing, Bowen and Fleming, and is a four-foot vein of the richest ore discovered in the camp, carrying black sulphurets to the amount of from 200 ounces to 700 ounces to the ton. It is developed by a shaft 40 feet deep and levels run each way from it 50 feet. Their choicest ore is sacked and stored in the mine until such a time as they can get it out and ship it to the smelter.

The Roving Boy is on Miller mountain, one-half mile north of Cooke. It is owned by Dave Noble & Co., and is a contact vein, having lime and granite walls. It has about two feet of ore, assaying nearly 200 ounces per ton, and a trace of gold. The mine is developed by three shafts, none of which are over 50 feet in depth; but all have a fine showing of ore, making it a rather flattering prospect. There are a great many other locations here; but those noticed are the principal ones and the most developed.

The close proximity of these mines to the National Park should certainly bring them under the observation of many Eastern capitalists, and thus enable them to combine business and pleasure and invest their capital in Cooke City mines, when at the same time they visit the "Wonderland."

Experiments in Quartz Crushing.

EDITORS PRESS:—For some time I have been thinking that it would be well for one of these old gray-headed miners to take up the pen and give the younger ones some lessons founded on long experience. There is no truer saying than that history repeats itself—so do experiments in quartz. Now that a new generation of miners are around, some are beginning to find real things in ideas that were worked out 32 years ago and exploded. It is not my purpose to take up what I refer to above this time, but to comment on Mr. Louis Blanding's statement in the PRESS of May 29, 1886, wherein he gives "trial of quartz mills."

Blanding says 15 stamps do so much—one pulverizer does so much, and another pulverizer heats all. Now to an old gray-headed miner, who has got all his gray hairs from pounding quartz, or rather having quartz pound him, this is all hosh.

It's all hosh making tests without entering into every detail, to wit, labor required, power expended, size of ore received, size to which ore is reduced, if character of ore is same, and then wear and tear of iron. I am one who has been forced into the belief that nothing equals stamps, and it will take clean calculations as above to change this notion, and there are plenty more like me. So come down to business with your testing and let us old miners have something to surprise us.

Another item in the same issue, somewhat in the same direction, from the Sierra Tribune, I must comment on. It was headed "Quartz-Crushing Machines," and intended to give a hint to the University of California. It says: "Which crushing machine shall I buy? This question, every man who is about to erect quartz machinery, and wishes to do the best for himself or his company, is forced to ask himself. So far the answer is, nine times out of ten, in favor of stamps; but it does seem strange that in such a brilliant age as ours no improvement can be made on the primitive stamp.

"Now, we beg leave to ask our State University colon if it is not possible, amid all the experiments they are continually carrying on in

the interest of the honest Granger, they can do a little for the honest miner? We think it would be a grand idea for the School of Mines connected with the university to undertake to test the various machines now offered for the grinding of quartz, in order to furnish the miner with accurate information as to their value."

This is a brilliant idea for a mountain paper. How much of a test could the State University give all these machines? The place to test mining machinery is in the mountains, and not on one ton but 500 tons; if they heat stamps which have held good for 35 years in California, then amen.

The writer of that article does not know much about the "primitive stamp" or he would not write as he does. The "primitive stamp" of this State was a square piece of 6x6 oak or other hard wood, with a flat 2½ inches wide cut through for an uncouth-looking cam to play for lifting it. A square piece of iron for a shoe was at the bottom, which wore into all kinds of shapes, even like the sharp end of an egg. The mortar was low and cased in with wood and sheet iron. For sieves we used sheet iron, with holes punched by a punch or a pick. They were "sorry old stamp mills." Then we dare not run over 60 drops a minute. What have we now, and what are the improvements of this "brilliant age"? Splendid batteries; high motors; symmetrical cams; round stems; iron stems; revolving stems; gill tappits; steel shoes and dies, wearing true; 50 and 90 drops per minute, and narrow mortars. In fact there is nothing of the old California "primitive" mill left. We have all the time been on the march of progress. Every year has brought out some new features in stamp batteries, and so we are marching on.

Louis Blanding will "prick up his ears" at this, I suppose. He's good on testing ores, but he is up on testing machinery? At all events, we old-fisted miners are not to be caught with chaff. I don't want to be understood as opposed to any new machinery, but I do exact proper data in all this trial business.

THE OLD MAN OF THE MOUNTAINS.

Sonora, Tuolumne Co., Cal., June, 1886.

Montana Metals.

Superintendent Braden, of the United States Assay Office at St. Helena, Montana, has prepared a statement of the mineral product of Montana for the calendar year of 1885. He estimates the value of the various metals as follows:

Gold.....	\$3,400,400
Silver.....	9,171,984
Copper.....	9,000,000
Lead.....	2,000,000

Total.....\$23,581,384

Ten counties are credited with gold and silver. The largest product of gold was from Lewis and Clarke county—\$1,417,960—and the largest product of silver was \$5,335,504, from the Silver Bow county. The totals of gold and silver are apportioned among the respective counties as follows:

Beaverhead.....	\$1,000,190
Chateau.....	27,002
Deer Lodge.....	1,961,391
Gallatin.....	35,693
Jefferson.....	1,319,926
Lewis and Clarke.....	1,861,432
Madison.....	310,560
Miner.....	412,938
Missoula.....	39,746
Silver Bow.....	5,621,666

Total.....\$12,581,384

It is presumed that Mr. Braden's official position gives him good opportunities for getting at approximate results, and the above statement may therefore be relied upon. As to the copper and lead products, he is not so familiar with the facts, but believes the estimates sufficiently close for all practical purposes. The Anaconda, owned in this city, is the great copper mine of Montana. Most of the product is shipped direct to England.

THE DEEPEST MINING SHAFT.—The Combination shaft on the Comstock is now down to the 3200-foot level. The Combination is already the deepest vertical shaft on the continent of America, and there is but one other shaft in any part of the world that has attained a greater vertical depth. This deepest shaft in the world is the Adelbert shaft in the silver mines of Prizham, Bohemia, which at last accounts had reached the depth of 3280 feet. The attainment of that depth was the occasion of a three days' festival, and was still further honored by the striking off of commemorative silver medals of the value of a florin each. Twenty years ago very few mining shafts in the world had reached a vertical depth of 2000 feet. The very deepest at that time was in a metalliferous vein in Hanover, which had been carried down 2000 feet; but this was probably not a single perpendicular shaft. As for the deep shaft at Prizham, there is no record of the beginning of the work on the mine, though its written history goes back to 1527. When work on the Comstock shall have been carried on for 359 years, our shafts, at the present state of progress, will be knocking holes in the bottom of China.—*Don De Quille, in Salt Lake Tribune.*

WHEN it is believed a prospector has struck a bonanza every one extends a hand and invites him to take a drink; but when it is discovered that the bonanza was only an imaginary one, nobody notices him as he passes by.

Local Cable Railroad Notes.

The new Hayes-street Cable road, connecting with the Market street system, was opened for traffic this week. The road has been thoroughly tested, and, as soon as its new cars are ready, will be in perfect running order. The color of the cars and lights is green, and they will run through to the ferries. The company has erected a commodious engine and car house on the north side of Hayes street, between Masonic avenue and Lott street, and the finishing touches thereon will soon be made. A 300 horse power Corliss engine, capable of running 50 cars with 100 pounds of steam, has been placed therein and is furnishing the motive power.

The fact has been mentioned that the money has all been subscribed for the construction of the new cable railroad along Powell street, from Market street to the hay at North Beach. The contract for building the road has been let to Messrs. Wm. H. Martin and John Ballard, two well-known capitalists here, who have, within the past year, been heavy investors in city property. Messrs. Ballard and Martin, with three other men of means, own the whole franchise for the road on Powell street. Such a cross-town cable road has been needed for at least ten years. Real estate at North Beach has languished for want of it. A franchise for such a road on Powell street was given about five years ago, but the company was a paper one solely. The only work done was the laying of rails and the breaking of a portion of the sewer thereby, on Powell street, in front of Calvary church.

The published statement that the Sutter-street Railroad Company had forfeited its right to build a cable road on Ninth street, from Mission to Brannan, is denied by Secretary Stevens. He states that so far from the franchise being forfeited, nearly all of the preliminary arrangements for the construction of the extension on Ninth street have been completed, and as soon as it is decided whether the task shall be done by the company or contracted out, work will immediately be commenced thereon. The franchise does not expire until a year from next September, though the work would have been completed ere this but for the difficulty of obtaining from the Market-street company the privilege of using the concrete method of constructing the road-bed and cable tube. This privilege, with others almost equally desirable, has now been obtained.

Upon the completion of the Ninth-street extension the work will be commenced of extending the cable road on Polk street through to Union street, and thence to the beach as soon as the blocks north of Union are graded.

It is the intention of the company to use steel rails exclusively hereafter. The rails on Sutter street, between the ferry and Polk street, are now of that metal, and the work of replacing with steel the iron rails east of Polk will be commenced within a couple of days, the new rails having been already distributed along the line.

In last week's PRESS we published the articles of incorporation of the Pacific Cable Railway Co., in which the directors are Leland Stanford, A. S. Hallidie, Charles F. Crocker, F. F. Low, James Moffitt and J. L. Wilcutt. The capital stock is \$2,000,000. Mr. Hallidie, one of the directors, states that the object of the incorporation is to amalgamate all the patent rights of the different cable companies of San Francisco, and thus terminate the endless legal strife at present arising out of the infringements of patents. The first cable railway constructed was that on Clay street. In 1875, owing to several improvements in Mr. Hallidie's patents having taken place, a corporation was organized to purchase and protect them. It was called the Traction Railway Company, and in it Mr. Hallidie held a considerable interest. In 1877, owing to still further encroachments on the rights of the patent-holders, suits were instituted and judgments obtained against the Geary-street and Sutter-street Cable companies. Then another corporation was formed, which succeeded to all the rights of the Traction Railway Company and was incorporated under the title of the Cable Railway Company. In 1883 the Market-street Cable Company was organized and became the possessor of various independent patents, including that of Henry Root. This was the last company formed with patent rights, and owing to the number of patents existing, and their great similarity to each other, numerous expensive lawsuits were instituted. This, of course, seriously hampered the construction of new cable roads, as corporations about to build were slow to purchase the patent rights from either company, fearing to become involved in a costly legal suit with the one whose patent they had not bought. To end all this is the object of the new incorporation. It is expected that the formation of the new company will give a great impetus to the construction of cable roads throughout the country.

FALLING BODIES.—As illustrating the force of a small object falling from a distance, it is said that a shot dropped from the dome of the State Capitol at Des Moines made a clean, neat hole through the inch-glass floor in the rotunda. The Blade says that last winter a lady accidentally dropped a heavy muff from the same distance, and when it struck the floor below the noise was heard all over the building and some supposed a gun had been fired off.

Alaska Mining Notes.

The mill at Douglas island is running at its full capacity day and night and ships \$83,000 in gold bars for the last month's work. It will do better in future, as some very rich rock has been struck on the line between this property and the Bear's Nest mine.

This placer excitement in Sitka grew out of the discovery of good gold indications in the gravel in a gulch not far from the beach at Jamestown bay, by Messrs. W. J. Prout and A. A. Starwalt. These gentlemen have gone down 16 feet and struck a stream of water which temporarily stopped their work. But they are providing force pumps and will prosecute the work to a full test. The indications continue good, and they say they will find the bed-rock in spite of the water or "bast."

The *World's* Washington special says: The Secretary of the Interior has received through the acting Secretary of Alaska, and indorsed by him, a petition from the miners and prospectors of Harris' mining district, which represents that large numbers of miners and prospectors have left and many others are preparing to leave that section for the recently discovered Yukon river gold diggings; that in order to reach their destination they must pass through a section of country inhabited by the rich and powerful Chilcat and Chilcoat tribes of Indians; that these Indians arrogantly demand exorbitant sums for their services in packing supplies across the Chilcat portage and threaten to prevent by force any other Indians from engaging in this service. The petitioners ask for relief. Trouble is feared, and at the request of the acting Governor of Alaska the United States steamer *Pinta*, under Lieutenant-Commander Nichols, has gone to Chilcat inlet to preserve the peace.

A correspondent of the *Chronicle* furnishes the following about the mining affairs of this Territory: Arriving at Sitka on the 13th ult., I found the capital city far more quiet than I had ever seen it before. Its inhabitants, however, were jubilant over arrangements being made for the opening of quartz mines at the head of Silver Bay district, distant 13 miles east. These mining locations are likely to demand the expenditures of some capital, but if I understand the ground they will never pay a dividend. Beyond this possible chance for a mining boom, Sitka has nothing to build upon. There may be a few garden patches through the town, but there is no agricultural range to back it up, notwithstanding recent published statements to the contrary. Being a port of entry, and at present the seat of our Territorial Government, many have been misled as to its commercial importance, but with this foregoing facts its future may be easily rated.

Owing to the stampede of miners to the new diggings of the interior, this town is every day like Sunday. About 110 men have already left here in search of the golden phantom. For several years different parties have been finding a little fine gold on the bars along the tributary streams of the Yukon river, but no gravel diggings have yet been discovered. I am in possession of all the facts connected with the asserted discovery of last season, which resolve themselves simply into an effort to attract travel hither. It would therefore be well for mining men to wait the result of those already off on this stampede before arranging for a trip to Stewart river. The expense, route and many obstacles to be encountered should be carefully considered.

The route from here is by boat or canoe up Lynn canal to the Chilkoot mission, distant 90 miles; thence, with Chilkat Indians as packers, up and over the Chilkoot pass to the head of the first lake, distant 35 miles, and thence by small boats down the lakes and river to Stewart river, distant 450 miles. Total distance about 575 miles. These Indians are charging 12 cents per pound for packing from the mission to the lake, and as they do not allow any one else to pack over this trail they have an ironclad monopoly of the business—in fact, the miners are not even permitted to pack their own blankets. At the lake, lumber must be whipsawed for boats, after which they are built. Necessarily each party is obliged to take in saws, axes and nails. The cost of supplies for the season and packing over the Chilkoot pass may be rated at \$2.50 per man from here; therefore this stampede has already cost the participants about \$27,500, the majority of whom will ever regret their trip to the interior.

The placer mine owners of Silver Bow basin will not be able to resume operations before June, owing to the lateness of the season. There will not be more than eight mines in operation, one-half of which will be worked out before the end of October next. The entire output from the basin this season will not go beyond \$40,000. As there are no quartz mines in the basin, though there are many locations, none of which will ever develop into the condition of paying properties, the outlook for this camp is not very expensive.

The mine and milling operation on Douglas island, locally known as the Treadwell mine, is continuing its regular monthly dividend of 25 cents per share. It is beyond doubt an immense surface body of low-grade ore. Doubtless the extensions will prove equally as valuable. The operations of this company have been and will continue to grow more conservative. There are about 75 Chinese employed about the mine, at the rate of \$1.50 per day each. Necessarily there are but few white men

in the company's employ, outside of the logging camp. A large building has just been completed for the company's merchandising establishment, which, when in operation, will draw the entire Indian trade from Juneau. Therefore the merchants here would like to get away, but can't leave owing to many circumstances peculiar to their method of doing business.

Notwithstanding the recent statements made about the great agricultural and pastoral possibilities of Alaska, especially the southeastern portion of this Territory, there is not, cannot, and therefore will never be the one or other. From present indications, the industries of the Territory will continue for the next 25 years as they are now. Fur, fish and mining, and, if I mistake not, the quartz-mining operations of the interior, will yet astonish even the bonanza operators of the Comstock lode.

Under existing circumstances, while there are even now opportunities for the investment of capital, Alaska is no place for poor men; in fact, there are far too many here already, many of whom would gladly leave the Territory if they were furnished with the necessary means. For summer tourists the inland or island passages to Sitka and return will ever seem a wonderland. These magnificently grand panoramic scenes of nature should be seen by all who can afford a summer tour.

Bullion Product of Colorado.

The Superintendent of the United States Assay Office, at Denver, has been making some figures as to the bullion yield of Colorado for the calendar year of 1885. These totals are made up from returns of the smelters, ores shipped from the State, purchases at the Assay Office and sales to manufacturers. The gold and silver product is given as follows:

Gold.....	\$ 4,000,800
Silver.....	15,427,973
Total.....	\$20,097,372

The silver mines of Colorado, especially those of Leadville, carry considerable lead. The product of lead for 1885 is stated at 51,550 tons, valued at \$4,124,000. Colorado has not done much in the copper line, yet we notice a value of \$256,936 for that product in that State last year. This swells the total value of the bullion yield of Colorado for 1885 to \$24,432,008, and places the State a little ahead of Montana. The *Mining Record* regards the figures for gold and silver in Colorado about \$2,000,000 too much, the excess being nearly evenly divided between the two metals. It is evident that Colorado and Montana are at present the leading bullion producers of the country. California still holds its position as the leading gold State, but Colorado is the leading silver State, and Montana leads all other Pacific States and Territories in copper. Nevada has fallen behind as a metal State in the last few years, yet the product of the Nevada mines is no small item in the grand total. It is to be hoped that better days are in store for the Nevada miners.

THE CUT IN COPPER.—The Butte (M. T.) *Inter-Mountain* says: Information was received by telegraph Monday evening to the effect that a cut has been inaugurated in the price of copper by the Lake companies, with the Calumet & Hecla in the lead, and the copper of that region was quoted in New York Monday at 10 cents, a drop of nearly 1½ cents. The object of this break is to try to close down all other copper mines in the country, and especially is the move aimed at Butte. While it may result in shutting down some of the mines in Arizona and other sections, the only effect it will have upon Butte will be to cause a large increase in the output. The Butte companies will of course have their profits on their present output considerably decreased, but it will meet the bluff by largely increasing its output so that the average monthly profit will be at least equal to what it was before. By increasing their output there will also be a small proportionate saving in the cost of production, and all of these things together will enable them to meet the play of the Lake companies in a manner that will make the Calumet & Hecla and other companies of that section sorry. The president of the Calumet & Hecla has gone so far as to advise Vice-President Oakes, of the Northern Pacific, not to extend that road to this city, because Butte will be hurt up in business in a very short time. It is understood, however, that Oakes gave him such an answer as will convince him that he knows less about railroad matters than he even does about hearing the copper market.

MINING IN THE NEW RIVER COUNTRY.—The present available grinding capacity of the district consists of eight arrastras and one five-stamp mill, all of which are running on rock that will pay from \$20 to \$185 per ton within two weeks, and with the increased facilities now in view the bullion production of the camp will be quite an item by fall. Unlike many mining camps, where the prospector and discoverers of the ledges are seldom able to reap the benefits of their labors on account of the hardness of this rock or difficulty in working the ore, the surface of the ledges here is soft, the gold is free and can be easily saved in the "poor man's mill"—the arrastra. Thus the chances to "freeze out" the discoverer in this camp, as is generally the result of many cases in older and perhaps richer

districts, will stand a very poor show here. The feeling among those who are interested in this particular camp is one of complete satisfaction with the prospects.—*Corr. Trinity Journal.*

About Ore Concentration.

The following extracts from a letter received by the *Virginia Enterprise*, from a gentleman of extensive milling and mining experience in Colorado, as well as on the Pacific Coast, contains well-considered and useful practical suggestions which will be read with interest. What he says about roasting rich bonanza ore from the Comstock is well worthy of consideration. It being a private letter, not intended for publication, we are not authorized to give the gentleman's name. He writes from a mining county in California, where he is operating at present: "I agree with the *Virginia Enterprise* entirely in its remarks relative to the impossibility of concentrating the chlorides of the Comstock by means of the patent machines now being introduced. They may succeed in concentrating the sulphurates, gold and similar metallic combinations to a certain extent, but the chloride ores forming the great majority of the Comstock they necessarily have to totally fail in concentrating.

"There are certain minerals, combinations of metals and minerals, and conditions of metals, which so alter their specific gravities that they will float or remain suspended in water. To attempt to concentrate such material in water is a manifest absurdity, and yet all inventors of concentrating machinery attempt to do this thing, apparently on the principle that gold or silver in any condition, because it is valuable, must necessarily be heavy. Tellurium, in combination with gold and silver, breaks up in crushing into the finest powder and floats off, and no form of wet concentration has yet saved it. The telluride ores of Boulder county, Colorado, illustrate this fact.

"Certain combinations of selenium and gold and tellurium and gold in California do the same, and chlorides of silver are in the same category. Metallic gold may be so fine as to escape both amalgamation and concentration, and can be saved only by chlorination, solution and precipitation, as is the case with certain of our own ores at this place.

"In the year 1876 I had some of the bonanza ore from the Consolidated Virginia or California mine sent me to my mill in Colorado. Its composition was free gold, gold combined with sulphuretted iron and chlorides and sulphuretted silver. Its value was \$135 per ton, and in milling, according to the report of the mine for that year, if my memory serves me right, not over 60 per cent was saved. I roasted it in my furnace, and found that chloride and sulphuretted combinations were broken up, and metallic gold and silver were formed. I had and have no doubt that in this way of treating the ore, followed by concentration, very nearly all the precious metals might have been saved at a quite reasonable cost. I doubt, however, if the very low-grade ores of the Comstock could be treated profitably in that way. It is too late to talk about saving values in bonanza ores when there are none, and not less absurd to go fishing for those lost values in the Carson river. I know something about that extensive dredging scheme and its projectors, and you can chalk it down for a predestined, unqualified failure."

KEEPING WATER OUT OF A SHAFT.—Another important mining scheme has just been begun here at Oroville. The idea is to sink a shaft and from this drive down a tube so as to work certain ground that has hitherto never been worked on account of the water. This is the same process that has been successfully used in sinking for foundations for bridges in certain localities. On top of the ground is a mighty air compressor, and from this pipe will lead to the working shaft. There are several sections of large tubes that look, to the uninitiated, like large engine boilers with the ends knocked out. The air pipe will run through these in such a manner that any degree of air pressure can be obtained that is desired. The pipe will have an apparatus similar to the faucet on a water pipe, so that the amount of air can be regulated by the workmen in charge. The men will be admitted to the first section and the valve closed behind them, and then an increased amount of air will be forced into this section. When the men have been accustomed to this for a short time, they will be admitted to the second section and then to the third, till they become able to stand a pressure of air so strong that it will keep back the water. Of course it will take rich ground to make a mine pay worked under the disadvantages of this plan, but there is a large amount of very rich mining ground that has never been touched on account of the trouble with water. The new works will be placed near Montgomery street, and the tunnel will be run under the hill back of Mrs. McCallan's residence. Work has just begun, and all the machinery has not arrived, but enough is here to show what the plan of working will be. This style of mining can do no damage, and will give employment to a large number of men, so that we hope to see it prove a grand success.—*Oroville Register.*

THE ARGUS MINING COMPANY, of Taylor, White Pine county, Nevada, shipped lately through Wells, Fargo & Co. ten bars of bullion valued at \$21,247.60.

Forestry Congress Meeting in Denver.

The next meeting of the American Forestry Congress will be held in September in Denver, Colorado. The next move ought to bring this Congress to California.

We have just received from Secretary B. E. Fernow a preliminary circular announcing the Denver meeting and calling upon all interested in Forestry to prepare papers for the meeting and to announce their intention to attend. The exact date of the meeting will be stated hereafter. Meeting in an arid State like Colorado, there will naturally be much brought forward which will be of practical interest in California. The questions, whether and how far the influence of forest cover on water supply can be established; whether and how far forest growing will change agricultural conditions in the arid region; whether and how far forest culture is there possible, and what the proper means of the reforestation of these wastes may be—these are questions of the greatest moment.

The secretary announces that the program will be so arranged, therefore, as to give ample opportunity for the presentation of actual experience and a discussion thereon; and the number of topics for papers of a speculative character will be limited to the following: 1. Relation of forests to water supply. 2. Methods of management for a natural renewal of Rocky mountain forests. 3. Methods of tree-planting in arid regions and the plains. 4. Profits of forest culture. 5. Possibilities and aims of forest experiment stations. 6. State and national forest legislation.

Upon another page of this issue will be found an essay by Mr. Fernow, which gives very important data concerning the value of forest conservation and extension in a country, depending upon irrigation for its agricultural development.

The economy of crude oil as a fuel is daily demonstrated at the Capital flouring-mills, Los Angeles, with its capacity for turning out 250 barrels of flour every 24 hours. A box-car, containing two tanks of the oil as it comes from the earth at Newhall, is run up on the track to the engine-room, where a pipe is attached which carries the dark substance direct to the injectors at the furnace doors, where it is blown in by jets of steam, creating an intense heat which develops steam to run the 200 horse power engine at a speed of 75 revolutions per minute. The *Los Angeles Herald* states that the amount of oil required is eight-tenths of a quart per hour per horsepower, or 40 gallons per hour when the full power of the engine is developed. Eight-tenths of a quart of oil is equivalent to 2½ pounds of Australian coal, which costs \$16 per ton in Los Angeles. In addition to the greater cleanliness, the services of a fireman are dispensed with at the mill. It would seem that other manufacturing establishments might adopt this fuel to advantage.

FURNACE.—The Belmont *Courier* says: The furnace lately purchased by the Giant Mining Company, at Park Canyon, of the Citizens' Mill Company, of Austin, is now in place in the mill of the former company. The roasting of its ore is now conducted with a double furnace under the T. J. Ball and A. Griffith patent. The company has demonstrated the fact that by the method of roasting used by it under this patent it can work its most refractory ore to about 92 per cent of its assay value. This is a splendid showing and result on this ore, which is considered one of the "hardest nuts in the country" to crack. The mine is showing a large and extensive ledge of ore which the Giant Company is now mining with a full force of men. The ore is of good grade and almost inexhaustible in quantity. This property, as well as its neighbor in Ophir, bids fair to make Nye county lively during the present year and add greatly to our bullion product.

ASSAYING A DOG.—John O'Neill is always a very quiet man about stocks, and if John hasn't got a pointer on Mono now, no one has. Everybody in this camp knows Towser, the Mono mine Towser. This dog Towser rides up and down on the cages, through drifts and crosscuts, and goes all over and through the mine perhaps oftener than any miner of them all. Yesterday a brilliant idea struck John and some others, and they spirited Towser into a hack yard. They washed his hair as clean to the skin as it possibly could be washed, and then carefully panned the muddy water to the very highest percentage, and the entire dog absolutely assayed in fine gold \$23.17, as weighed on Soderling's scales. When Mono assays \$23.17 to the dog, she is certainly starting out on a boom, and we defy any mining camp on the Pacific Coast to beat it.—*Bodie Miner.*

FRESNO MINING DISTRICT.—From Mr. G. W. Fuller, of the Rocky Bar mine, we learn that mining matters are active in that locality. The mountains are full of prospectors, new lot-cations are being made every day, and all that are being developed so far show satisfactory evidence of richness. A five-stamp quartz mill has just been put up at the Rocky Bar, and commenced work with over 70 tons of rock on the dump. Twelve men are now employed at this mine, and the deeper down the lead is followed the broader the vein becomes, and the rock also becomes richer. Rev. Mr. Meserve, of this city, is interested with Mr. Fuller in this fine mining property.—*Fresno Republican.*



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SAN FRANCISCO:

Saturday Morning, June 12, 1886.

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Mines Wanted—Box 255 (B.)

Assayer—Thomas Price.

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Passing Events.

Although the Comstock mines are not paying dividends a good deal of money is being taken out there. The payrolls last month amounted to \$218,538—a large sum to be paid out in one camp for hands in mines and mills.

The Attorney-General has rendered an opinion in regard to the authority of the War Department to take action against hydraulic miners who cause the debris of their work to flow into navigable streams that are being improved by the Federal Government. The Attorney-General holds that there is nothing in the present law that warrants such action on the part of the Secretary of War. The River and Harbor Bill anticipated this decision and contains a provision which instructs the Secretary to institute proceedings against such offenders.

The disturbed condition of affairs in India keep the silver market in a state of fluctuation. The first decline in silver for weeks was occasioned by the Indian Council getting \$100,000 silver below their limited price, and the decline last week was, no doubt, a repetition of the Indian Council's tactics.

The Fire Patrol Salvage Pump.

A new and very powerful salvage steam pump has been recently completed by the Dow Steam Pump Works of this city for the Underwriters' Fire Patrol. The purpose of the pump is to free flooded basements or cellars of buildings of water, which may have accumulated there from fire engines, where no outlet has been provided to carry the same off into the sewers by suitable pipes. Some of the more recently constructed buildings in this city have been provided with these outlet pipes, which are a safeguard against flooding from rains or bursting pipes, and in case of water from fire engines. These outlets are, however, liable to derangement and to choke up.

In the case of the Crocker fire on Bush street, the basements of the whole block were more or less flooded for several feet in depth by the immense quantity of water poured into the burning building and no adequate means of at once freeing the accumulation of water. The consequence was that something like \$75,000 of damage by water to the goods in these basements was done in a few houses, and the insurance companies were compelled to pay the damage, as it was caused secondarily by the fire in the adjoining building.

To obviate the recurrence of this disaster, Mr. Wm. McDonald, agent of the Connecticut Fire Insurance Co., suggested to the Directors of the Underwriters' Fire Patrol, of which he is a member, to have constructed a powerful low lift steam pump, mounted on wheels, which could be available in a similar emergency. The subject was taken into consideration, and a contract made with the Dow Steam Pump Works for the construction of the pump.

A brief description of the pump is as follows: The boiler is an upright tubular, 30 inches diameter and seven feet high, and contains 1½-inch tubes—in a submerged tube head—and has 175 feet of heating surface. The pump is a vertical plunger, 16 inches in diameter and 18 inches stroke, working in an annular ring, in an interior case. This interior case carries the valves, 32 inlet and 32 outlet; a vertical diaphragm partition dividing the inlet and outlet sections. An exterior case makes, with the interior case, an annular space of about four inches into which the water flows from the suction pipes and thus furnishes water to the suction valves arranged around the half circle of the suction side. The area of these inlet valves is about 25 per cent in excess of the area of the plunger, so there is a minimum amount of friction in the water passages, and the valve seat easily and freely. The outlet is arranged in the same way.

The pump is made in halves, horizontally, and bolted together by a flange connection. The bottom is also similarly arranged, so as to get at the pump interior. Hand-holes are also made to get at the valves. The whole pump is made of the best gun metal (copper and tin). The steam cylinder is 10 inches diameter and 18 inches stroke, and arranged with Dow's patent valve motion, and will make 128 strokes per minute, drafting water from 25 feet and discharging 2000 gallons per minute at the pump level—as much as three or four Amoskeag fire engines can pump in the same time through 1½-inch nozzles. The power of the salvage pump being for lifting a large quantity of water from a depth of, say 20 to 25 feet, and the fire engine to force a smaller quantity to a distance or height.

The whole machine is mounted on wheels similar to a fire engine, but it is so arranged that when at work the weight rests directly on the ground, avoiding the jar that would otherwise occur did it remain with the weight on the wheels.

The weight of the pump complete is about 9000 pounds, and is handsomely finished with lagging and Russia sheet iron casing and brass hands, and brass dome on the boiler.

The whole machine has a light and graceful look, although so powerful and strong. The suction can be taken from two or one seven-inch flexible suction hose as required—and a draft from two adjoining basements if necessary.

A pump similarly arranged and constructed by the same builders is in use as a circulating pump in the United States steamer *Rush*, and gives great satisfaction.

THE Grand Prize at Tuscarora has shut down.

Working Gold-Bearing Sulphurets.

Concentration and Chlorination in Nevada County, Cal.—No. 5.

(Written for the PRESS by C. A. SCURNEK.)

Leaching the Ore.

In some camps it has been the experience that if rich auriferous silver ores, in which the percentage of gold is high, almost equal to that of silver, are subjected to a chloridizing roasting, then impregnated with chlorine gas, leached with water for the purpose of extracting the gold, and finally leached with hyposulphite of lime for the purpose of extracting the silver, the yield in gold hardly amounts to much more than about 50 per cent, more or less, although a high percentage of silver is extracted. This is not in accordance with the experience of the metallurgical works in this district, where the roasted ore is first impregnated with chlorine, then leached with cold water for its tenor of gold and then leached with hyposulphite of lime for the silver. The roasted ore after cooling is passed through a coarse sieve, eight holes to the running inch, for the purpose of separating the lumps which have been formed during the roasting, and also for separating impurities, such as nails, pieces of iron which might have been accidentally mixed with the ore. The sifting is not done into the vat, which is the rule in other districts, but on the brick floor, the sieve standing on the latter in an inclined position. The separated lumps are recrushed and added to a new charge in the furnace for the purpose of being roasted over. The ore of which these lumps consist is only imperfectly roasted, so that the gold which they contain would be in a state not to be acted upon by chlorine, even if recrushed, if they were charged into the vat without re-roasting. They would, moreover, cause a still more serious loss from the ferrous sulphate of iron resulting from the imperfect roasting of lumps. In the gold-leaching vat this sulphate of iron would be dissolved in introducing the water and precipitate some of the gold in the vat, which would be almost entirely lost, as little of it is redissolved in the subsequent leaching with hyposulphite of lime.

The roasted and sifted ore is now spread out in a layer on the brick floor and

Moistened With Water by Spraying

It over the surface to such a degree that the ore does not dust any more after working the water by means of a hoe well into the whole mass. This is done for two reasons: first, the chlorine does not act as vigorously on dry ore as it does on moist; and, second, dry ore would pack more in the vat than ore which is just moist enough, so that it doesn't dust; the former offering consequently more resistance to the ascending gas, and unnecessarily increasing thereby the time of working a charge in the vat.

It has already been stated that the roasted ore is not sifted into the vat at the Providence and other chlorination works around Nevada City; it is charged into it by means of a square wooden box, holding about 50 pounds of ore. After filling the box from the prepared ore lying on the brick floor, the workman transfers the charge into the vat, where he dumps it on the prepared filter. Charging the vat in this careful way makes it sure that the mass of ore is in as light and porous condition as can be.

The Filter on the False Bottom

Is prepared with old gunny sacks. In a damp condition they are spread out on the floor, so that the latter is covered with one, or better, two thicknesses of them. At the sides the cloth is drawn up from two or three inches, forming a ring which is held in place by the wood on one side and on the other by a ring of ore, which is slightly pressed by hand to the cloth. By this means the gas is prevented from ascending quicker on the sides than toward the center, and also that the leaching water works through here faster than at other places, disturbing perhaps the filter and carrying with it more or less of the ore, which would run with the filtrate into the precipitation tank. No gravel bottom is used in preparing the filter.

All the Tubs

Are painted inside and out with three coats of liquid asphaltum varnish—the false bottom also—which should be renewed every year. The tubs are charged with 2½ to 3 tons of ore, which fills them to within three inches of the cover,

which is now put on by the aid of a tackle, which hangs from a small truck, traveling on a suspended track over the whole line of tubs. When the cover is set into its place, the circular groove left around its edge is calked with rags, and the joints are wetted and luted with plenty of tough dough, which is kept moist by a covering of wet cloth.

The gold chlorination tubs have the following dimensions: Diameter at top, 5 feet 9 inches; diameter at bottom, 6 feet 3 inches; depth to the false bottom, 3 feet. The bottoms are made of three-inch planks tongued together; the staves are of two-inch stuff with plain joints; a hatten three-quarters by two and one-half inches is laid over each joint; four iron hoops are driven hard around all. The false bottom, one inch above the true, is made of one-inch boards, perforated with one inch holes. By means of a short piece of lead pipe, a so-called lead nipple and a one-half-inch rubber hose, the gas is led from the generator into the tub below the false bottom. From a wooden faucet, which enters also below the false bottom, the gold solution is conducted by means of a rubber hose to the precipitation vats. The chlorination vat is slightly inclined toward the discharge side to insure complete training. The false bottom rests on strips of wood, which are made thicker at one end than at the other, so that it is horizontal.

Foundry Notes.

Business at the foundries continues rather dull. A few months since there was a little "spurt" of work, and it was hoped the long-looked-for advance in business had come, but it has dropped back into the old groove again. There is more or less work going on, of course, at all the foundries, but there are few large jobs in progress.

The steel armor plate made recently in this city and sent to Washington for exhibition, to show that armor plating can be made in this country, is attracting considerable attention. It is eight feet six inches long, two feet six inches wide and ten inches thick. It is of hammered steel, end was cast at the Pacific Rolling Mills, the planing, trimming and finishing being done at the Union Iron Works. It shows that the Union Iron Works can get all necessary material here for building armored vessels in California.

The contract for the great steel dome of the Lick Observatory on Mount Hamilton has been awarded to the Union Iron Works of this city for \$58,850. The dome will be 76 feet in diameter. The iron plate on top of the brick will weigh 37 tons. The moving part of the dome will weigh about 90 tons with wall plate, 127 tons in all. The bid of the Union Iron Works was \$56,850 to construct end set up the dome complete. The Eastern bid for this was for the work to be delivered in the maker's workshop, and after figuring the cost of transportation and erection on Mount Hamilton, the California firm not only submitted by far the best design, but was the lowest bidder, and the sequel shows that California is in the front rank of progress. It is the hope of the trustees that in one year from next August the Lick Observatory will be turned over and become one of the great institutions of this State, with a surplus from the endowment fund of \$200,000.

The Pacific Rolling Mill Company, of San Francisco, has entered suit at San Jose against the Saratoga & Alameda Railroad Company for recovery of amount due for supplies furnished.

RESIDENTS of Virginia City are alarmed at the settling of buildings owing to the caving of underground drifts and the giving way of timbers. Dr. A. M. Cole recently had to remove the plate glass from his show windows to keep them from falling out. On examination there was found to be a space of two inches between the top of the plate glass and the window frame.

THE Virginia City, Nevada, papers say that the new find at the foot of Six-mile canyon, known as Pfeifer's ledge, is barren of metal as far as prospected. The ledge is a blind one, and locations have been made toward every point of the compass.

At the United States Assay Office at Helena, M. T., recently, 1823 ounces of gold were received in two days—the largest amount for the time known in the history of the office.

Price's Bullion Rooms and Ore Floors.

Professor Thomas Price is well known all over this coast from his long connection with the mining interests, both as an examiner of properties and as an assayer and analyst. He has been in the business in this city since 1862, and in his present quarters, No. 524 Sacramento street, since 1875. No establishment of the kind in San Francisco is better known, or has better facilities. The building is a large one, and is entirely devoted to Professor Price's business, being so arranged that the various departments on the two floors are properly separated, while at the same time the professor can exercise a proper supervision over all. The numerous employees are all skilled in their several branches, and most of them have been with him many years. Many persons in the mining regions have had business and correspondence with this establishment without being able to visit it, and to them a brief description will be of interest. The business naturally divides itself into three departments: the bullion, the metallurgical and the chemical.

The Bullion Department.

The department includes the receiving of bullion, melting, assaying and refining. The bullion is received in all shapes, crude and otherwise. The base metals are separated and it is put in such a condition that its value can be determined, in order to realize the highest possible price. Professor Price does not buy bullion, but prepares and offers it for sale, so that the highest bidder each day can procure it. In this way the bullion owner gets the benefit of the highest ruling price of the market. Both gold and silver fluctuate in value more or less on account of the demand for exchange, and there is more or less speculation in silver on account of the fluctuation. For the refining of gold they have lately added to the establishment the well known Miller process, which is that used now in all the Australian mints, all the gold in that country being refined by that method. Having lately secured the patents for certain methods for refining by the sulphuric acid process, a complete department in that direction will soon be added. Attached to the bullion department is a complete and separate assay office for conducting that work by itself, without coming in contact with the ore assaying establishment. Now that the U. S. mint is closed for its annual settlement, the bullion department is kept busy. Miners will be enabled to get returns from Professor Price more promptly than from the mint, and bullion may be deposited in the same manner.

Metallurgical.

The metallurgical department is fitted with an extensive ore floor, with ore crushers and pulverizers, for the crushing and sampling of ores, amalgamating pans for working tests, and facilities for testing any process for the extraction of gold and silver. There are special furnaces for smelting rich ore and other products, such as sulphides of silver produced from leaching process works, etc. Arrangements are made also for handling jewelers' sweeps, photographic liquids and paper, etc., by special methods, by which it is possible to realize the maximum values for these and similar products. Particular attention is paid to the concentration of ore with a view to ascertaining the best form of concentrator according to the nature and character of different ores. Assaying in all its branches and analysis of ores are conducted in this department.

The key to the proper treatment of all ores is a full knowledge of their composition. The analysis should be the very foundation of any plan of treatment, since to work the ore properly its exact character should be known with all its constituent parts. This fact is better realized now than it has been and more ore analyses are being made in consequence. The facilities for this work are very complete.

In this connection it may be stated that now this and other cities are putting more stone into buildings, the character and permanency of the building stone should be thoroughly examined. Its power to resist the action of the weather and of fire should be tested, and for these points much depends on the character of the component parts. New cities should reap the benefit of the experience of others, and the properties of our peculiar building stones should be tested.

The Chemical Department.

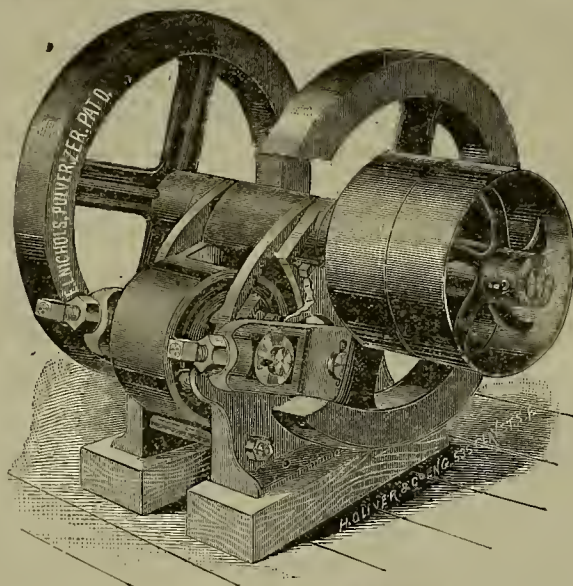
This consists of the chemical laboratory with

all the appliances and apparatus for all kinds of analytical work. A particular specialty is made of analysis of food, drink and poisons and all industrial products. The laboratory is very completely fitted up with the apparatus necessary for performing both organic and inorganic analyses of everything that presents itself. Investigations will be undertaken of chemical processes of any kind. Prof. Price will make estimates and prepare plans for the construction of works and factories for the manufacture of chemical products of all kinds, and examine into the character and nature of all by-products and their utilization. Analyses are also made of mineral and domestic waters, etc.

All these departments are personally supervised and conducted by Professor Price, and numerous skilled assistants, chief of which is his son, Arthur Price, who has studied his profession in the leading chemical schools of England and Germany. The appliances and apparatus are all of the best in each department, and the whole establishment is conducted on a scale commensurate with its importance. While a large portion of the work is that connected with the assaying, refining, sampling, testing, etc., of ores and bullion, as may be seen, all matters relating to sanitary and industrial chemistry are carefully attended to.

Academy of Sciences.

At the meeting of the Academy of Sciences on Monday evening, Vice-President T. J.

**THE NICHOLS ORE BREAKER.**

Evans presided. A. W. Glassford was proposed for resident membership. Quite a large number of donations to the museum were received. These donations consisted of 18 or 20 specimens of sections of native California woods, which had been contributed to the Department of Economic Botany. They were from Towles Bros., of Alta, Placer county, and were donated by Mr. Durgan of the museum of the State Mining Bureau; four globes of crystallized lime from Keokuk, Iowa, donated by Mr. A. Von Schmidt; two specimens of marine life from Ceylon, presented by Mrs. T. H. Hittell; a voracious marine eel, more feared by the divers for coral in the neighborhood of Torres straits than the shark, by the same; a polyp from the bottom of the sea, near Falmouth road in the British channel, presented by Joseph Elfelt; several specimens of elementary coral and marine life from Apia, Samoan island, by United States Consul Greenebaum; an edible worm from the South Pacific islands, spears, bow and arrows, implements of war and the case and insignia of authority made and used by the natives of the New Hebrides islands, by Captain Simpson; other specimens of marine life from different persons. As a number of these articles were from the South Sea islands, a region with which Captain Churchill is familiar, that gentleman gave a very interesting description of the uses to which the various implements are put, and spoke of the customs of islanders in the different groups.

The damage done to the main shaft of the Grand Central mine at Tombstone, A. T., by the recent fire is more serious than was at first supposed.

The Nichols Ore Breaker.

Mr. E. I. Nichols, of this city, has recently patented, and is now manufacturing, a new style of ore breaker and pulverizer, for which many advantages are claimed over machines of like character in the market. It is very compactly built, simple and durable. The jaw is mounted on a revolving eccentric shaft, working against a cylinder or roll in an oscillating motion, which causes the roll to move slowly around with each down stroke of the jaw, but it is prevented from moving back, as the jaw ascends, by small balls, which lay in each end of the roll and against wedge-shaped projections, on the inner face of sides. The lower end of jaw is secured to the shaft of the cylinder by connecting bars. In the end of those bars are heavy set screws for regulating the grade of crushing to be performed. The jaw is provided with a shoe of white metal or steel which can be reversed. The eccentric shaft is fitted with two heavy balance-wheels, tight and loose pulleys. The engraving on this page represents this new machine.

The small machines are made with a lever, and are suitable for assayers and esmples, on account of the ease and rapidity with which they can be cleaned up after pulverizing each lot of ore. Another style of these machines is made with crank and pulley, and is a very desirable article for prospectors on account of the ease with which it can be transported on pack animals. Wet or dry ore can be crushed to

any desired fineness, and will always have a free discharge, the cylinder or roll carrying down the pulverized ore as rapidly as the process of crushing is accomplished. Mr. Nichols claims that any roller, ball or stamp mill can accomplish from 30 to 40 per cent more work by the use of his machine in conjunction as a fine crusher. He claims further that it will accomplish as much work as any roller mill of like capacity with one-third the power necessary to operate the roller mill. The capacity of these machines ranges from 500 pounds to 16 tons a day, according to size.

THE American Association for the Advancement of Science and the New York State Exempt Firemen's Association will meet at Buffalo, N. Y., on August 17th. The city council has appropriated \$5000 for the Fourth of July and the reception of the distinguished visitors. The local scientists have asked for \$2000 of this to help entertain their friends, and the firemen want \$2000. There is now a quarrel to see which shall get the appropriation.

OF THE mining assessments delinquent this month, aggregating \$213,500, Nevada calls for \$144,000, California \$17,500, and Arizona \$52,000. For the same month last year there were the same number of assessments, amounting in the aggregate to \$270,900, of which \$232,000 was claimed by the Nevada mines.

It is stated that the sale has been perfected of Henry's diggings in the eastern part of El Dorado county, a gravel mining claim, for \$30,000. A Chinese firm in San Francisco were the purchasers.

Mining Accidents.

Elijah Hill, a well-known miner of Bingham, Utah, came very near losing his life the other day in the Winnemuck mine. He had just come up from the shaft, and ordered the cage returned to the 100-foot level. The cage was returned and Mr. Hill, forgetting all about the matter, turned in a few minutes and walked into the shaft, falling the distance of 100 feet. He broke both legs and an arm, and it was almost a miracle that he did not lose his life.

Fred Telham, employed in the Prudence mine, Nevada county, while working in one of the stopes was hurt by a large rock which became loosened and fell upon him.

Patrick Mullen was very badly injured in the hoisting works of the Badger mine, Grass Valley, last week. Mullen was working there and having occasion to cross from one side of the building to the other, he attempted to cross over the sweep-hob of the pump. The pump was running at quite a high rate of speed. Mullen waited until the "down stroke" of the hob and then proceeded to cross. He missed his calculation and was not quick enough, for the "up stroke" caught him beyond his balance and threw him violently into the cogs of the wheels running the pump. The rapidity of the revolutions soon drew the victim in, and the wheels began their horrible work. The left foot was chewed off just above the ankle, leaving the foot with the boot upon it on the floor under the machinery. The right leg was badly crushed below the knee, both bones being fractured. The flesh and outer muscles of the left thigh were frightfully torn and mangled, almost exposing the bone of the thigh.

A miner employed in the Clark's Colusa mine, Butte, was killed last week. Shortly after midnight he left his work and went back about 100 feet from the shaft for a drink of water. When he started to return it seemed to occur to him that it would save time if he would take some giant powder back to the face of the drift with him. There was about 11 pounds of giant powder in a box and some boxes of caps, which had been placed at this point to guard against accident while blasting. He was seen to stoop over the box containing the powder and caps, when his miner's candlestick dropped in among the caps and a terrible explosion followed. On going to the place where the explosion occurred it was found that his head had been entirely blown to pieces and that his breast and shoulders were in much the same condition.

About 15 minutes after the occurrence of the above accident Alex. Finlayson, who was working on the 800-foot level of the same mine, was getting ready to put in a set of timbers. His partner was on top getting the material. While clearing away the dirt a lot above caved, striking him on the head, causing a severe scalp wound.

AMONG the most notable mining regions around Spokane falls is the South Fork country. Geographically it is known as the South Fork of the Cœur d'Alene river. Three years ago there was not a prospect hole here. Now there are two thrifty towns, seven prosperous camps, a permanent population of at least 1000 people; while swarming the hills, following old trails or blazing new ones on their way through a terra incognita, there are said to be at present 500 miners.

IN the matter of the Smokehouse lode mining claim at Butte, M. T., the Secretary of the Interior has declined to advise that a suit be instituted in the name of the United States, to set aside the patent issued for said claim. Application was made on behalf of the claimants under the town site location. The case involved a large amount of property rights in Butte City.

COAL is in fair movement, with a scarcity of Seattle, West Hartley and Scotch. There has been no Seattle on the market for a month or two, but renewed supplies are expected soon. Receipts of coal for May were 67,129 tons, making the total since January 1st 290,306 tons, against 382,811 tons for the same period in 1885.

FRANK P. McLAIN, a graduate of the University of California, who has been in the Patent Office for some years, has been promoted to be Chief Examiner in the Metallurgical Division.

MECHANICAL PROGRESS.

Novelties in Locomotive Construction.

One of the recent novelties in locomotive construction in France is to be found in the design of M. Estrade, which he proposes to try on the southern lines in France. M. Estrade has not confined himself to the locomotive, but has also designed a complete system of rolling stock for a passenger train, which has been exhibited in model form at the Conservatoire des Arts et Metiers, and will shortly be put to the practical test. His locomotive is of the outside cylinder type, with slide-valve on the top of cylinder, and all the gear carried outside, according to the general plan on the Continent. He believes in large wheels, and the six wheels of his locomotive are 8½ feet in diameter, coupled and placed as close together as possible.

It is calculated that this engine will be capable of maintaining speeds of 72 to 78 miles an hour. The tender also has wheels 8½ feet in diameter, but otherwise presents no features of novelty.

The coaches are peculiar in that they are carried inside iron girders, while the wheels run under the center of the longitudinal seats, thus admitting of a much larger diameter than those in ordinary use. Two axles, 16 feet apart, support, through elliptic springs mounted upon the oil boxes, these longitudinal girders, which have ends curving toward the ground. Each girder carries three other elliptic springs, from which is suspended, by means of iron rods, the lower frame on which the body of the car is supported. The coach is separated into two stories, the lower of which is made in three pendant sections with doors, which may be used as baggage-rooms, etc. Above is a single compartment with central passageway, reached by stairways at each end of the coach, and communicating with the other portions of the train by hinged platforms.

Another novelty is the compound engine of Mr. Von Borries, which is employed on the Hanoverian section of the Prussian State Railways, and which is especially notable for the starting-valve, which is shut by the driver when he wishes to start, and blocks the passage through the receiver from the high to the low-pressure cylinder. While the valve is in that position steam can flow from the boiler to the low-pressure cylinder through a pipe and connection, in which it is so throttled as to equalize the steam pressure on the larger area of the low-pressure piston. The engine having thus been put into motion, the exhaust from the high-pressure cylinder passes into the receiver, but cannot pass to the other cylinder, because the way is blocked by the starting-valve. The pressure accordingly accumulates in the receiver until it is sufficient to force the starting-valve back against the pressure of the throttled steam supplied direct from the boiler to the other side of the valve, when the engine at once commences to work compound. The starting-valve is, we believe, arranged to work automatically, so that all the driver has to do is to open the regulator in the ordinary way, and the engine will start, as boiler steam is supplied to both cylinders. Compounds of Mr. Von Borries' make have been working for the last five years, and, it is stated, with a fuel economy of from 10 to 20 per cent over engines of the same weight and performing similar duties.

STEAM CUSHIONING IN THE CYLINDER.—The statement has been made by machinists of repute that compressed steam cannot be used for a cushion in the cylinder of a steam engine except at the expense of a portion of the power stored up in the fly-wheel. Against this opinion, it is said, there is a certain amount of power lost in reversing the reciprocating parts of a steam engine, but what we want to know is how to obtain that power with the least expense. Within certain limits compression for that purpose is right. In case we have no compression and the piston is allowed to pass to the end of the stroke perfectly free, we will be compelled either to call upon the fly-wheel to arrest the momentum of the piston and connection, or to give the valve excessive lead. In the former case there would be a loss of power, and in the latter a loss of steam. For instance, take a steam engine 30x36 inches, with piston, cross-head and connecting rod weighing 1300 pounds, and a piston travel of 600 feet per minute. When that 1300 pounds of metal is moving in a straight line at a rate due to the piston travel, we want to stop it at the end of the stroke, and start it back on the return with as little expense as possible. In a well-regulated engine the compression should be just sufficient to bring reciprocating parts to rest independent of any appreciable strain on the crank-pin. The steam which has been forced into the clearance has taken no power from the fly-wheel, but has relieved it of the resistance it otherwise would have met in reversing the heavy parts. A steam engine cannot yield good results without a cushion.—*Iron.*

DRIVING GRINDSTONES.—An improvement in the driving of grindstones and emery wheels is that by which the wheel is given a reciprocating lateral motion in addition to its rotation. Every one has noticed the advantage of moving a tool from side to side on a grindstone so as to equalize the attrition on the different parts of the edge. It has now been found that by making the grindstone move laterally, and

keeping the tool still, a more perfect result is attained, while the detached particles of steel have an opportunity to drop off the grindstone instead of being crushed into it, and the wear of the stone and the heating of the tool are both greatly diminished.

CHIPPING IRON.—We find in a cotemporary monthly journal a very neat engraving showing the correct attitude of a chipper chipping away at his vise. It seems that the hammer must be held by the handle close to its outer extremity, where it tapers toward the end, so that the hammer can be brought into a position close behind the right ear. The chisel is placed at an angle of 45° with the surface of the work, and pointed directly at the left eye, which may be either open or shut, as the hand effectually hides the view of the chisel's edge. With the body erect and the shoulders well thrown back, with a slight inclination of the head, the chipper chips his work so nicely that the marks of the chisel are scarcely discernible, which contrasts greatly with the distortions of our best workmen, who make use of at least 13 different grasps of the chisel in chipping out a medallion. The hammer apparently takes care of itself, and may be seen almost anywhere within reach of his right hand. All parts of the body are in sympathy with every movement of the chisel, and the eye of the workman at all times is intently engaged in taking cognizance of what the cutting edge of his chisel is doing.

STEEL NAILS.—A hardware dealer correspondent of the N. Y. *Iron World* writes in regard to steel nails as follows, from Peoria, Ill.: "Steel nails are not meeting with any favor from the majority of our mechanics and leading contractors, nor am I compelled to keep them in stock to any amount. The objections offered are that in case the steel nail bends in driving or is not properly driven, and necessitates being pulled, it is almost impossible to withdraw it without tearing the board. I have examined the steel nails closely and find they taper from one side to the other very gradually, and this fact causes them to turn, and consequently bend very firm. In nice work the withdrawing of a nail mars or breaks the wood, which is not the case with an iron nail, possibly because it is formed differently. When a nail is driven it is generally intended to hold and remain there, but it is customary for mechanics to use their studding for making temporary scaffolds and afterward knock it apart and use it in the building. As far as security goes, the scaffold is made more safe with the steel nail, but it renders the lumber unfit for use."

THE "DEAD CENTER" is the point in the stroke where the crank and piston rod are in the same right line. To find dead center, turn engine in the direction it runs until crosshead is within a short distance of its limit of motion. Mark guide at end of crosshead shoe. Mark some revolving circular part of engine, as disk crank or fly-wheel, and place one point of a fixed tram in this mark and the other on some fixed object in line. Now turn engine past the center in the direction she runs until end of crosshead shoe passes mark on guide. Turn back till shoe reaches mark. Holding tram still on the fixed object, place other point on selected revolving part and mark as before. Bisect distance between marks on revolving part, and turn engine till point of tram rests on central mark, and the engine is on "dead center."—*Wood and Iron.*

WASTE OF STEAM IN WHISTLING.—A well-posted railway man says that the obligatory tooting of a locomotive on the New York, New Haven & Hartford Railroad in an ordinary day's run involves a waste of steam requiring the consumption of 230 pounds of coal to renew. He estimates the whistling expenses of that particular railway at \$15,000 per year. There is a similar waste in the blowing of the whistles of stationary and steamboat engines. It is a matter worth the serious study of practical railroad men whether they cannot devise a cheaper voice with which to give notice of the approach of trains to stations and grade crossings.

MACHINERY ON TRIAL.—Buyers of machinery on trial, subject to their approval after operation for a stated period, should remember that they can be held legally responsible for the price of the machinery if they fail to signify their rejection of the same within the specified time. Usually there is a well-understood agreement in these matters; but sometimes there is not, and in such cases it is only just that if the machine purchased is not satisfactory the user should notify the seller as soon as the fact becomes apparent.

STRIP ROLLING.—A sharp thing in steel strip rolling has just been accomplished at the Earl of Dudley's Round Oak Works, England. One of the mills produced in a single turn 25 tons 1 cwt. of 1½ inch by 3 w. g. steel strip in lengths of 12 feet 3 inches. Considering the nature of the material and the size of the strip, this make, it is believed, is unprecedented in the annals of strip rolling in England. The blooms were heated in Mr. Smith Casson's gas-heating furnaces.

THE FIRST CHAIN FACTORY in the South is about to be inaugurated in Birmingham, Alabama, for the purpose of supplying the Southern market with trace chains.

SCIENTIFIC PROGRESS.

An Immense Aerolite.

Our readers will recollect an article which appeared in these columns in October last, in which allusion was made to the report that an immense meteor had passed over a portion of Washington county, Penn., on the night of September 14th, and which was described by several who saw it as being "as big as a barn," and that it was seen to fall but a few miles distant. Professor Emerick, of Williams and Mary college, immediately started in search of it, but failed in the effort. About the middle of last month the professor was again called to that region on quite a different errand—in search of a location to bore for oil. While thus engaged he accidentally stumbled upon the undoubted object of his former search, which in its glowing state, while passing through the atmosphere and in near proximity to the earth—about 50 miles—must have appeared to observers nearly under its track, quite as large as an ordinary barn.

It was found near the point where it was supposed to have fallen, on the farm of Frederick Miller, about two miles north of Claysville, Washington county. It was lodged at the base of a hill, and was deeply imbedded in the soil and covered with dry leaves which had blown into the opening. Prof. Emerick says it is the largest aerolite ever discovered in the world, and is considerably heavier than the combined weight of all the aerolites known to have fallen in the United States. It weighs not less than 200 tons, and is composed of chromium, nickel, copper, aluminum, magnesium, and 10.87 per cent of it is iron. He calculates that it was seen in motion for a distance of 150 miles, and moved at the rate of 20 miles a second. It required three men several days to unearth the monster. It had penetrated the earth until it came in contact with a stratum of limestone, when this sudden check of its fearful velocity caused it to break into many pieces of all sizes and shapes; yet when the earth was removed from around it, it still preserved its original shape, so that the professor was enabled to have a photograph made of it, and it only fell to pieces when the specimen-hunters tackled it.

Expansion Produced by Amalgamation.

At a recent meeting of the London Physical Society a paper on "The Expansion Produced by Amalgamation," by Professors Ayrton and Perry, was read. It had been accidentally observed by the authors that the amalgamation of brass is accompanied by great expansive force. If one edge of a straight, thick brass bar be amalgamated, it will be found that in a short time the bar is curved, the amalgamated edge being always convex and the opposite concave. The authors imagine that a similar action may be the primary cause of the phenomena presented by the Japanese "magic mirrors." Japanese mirrors are made of bronze, and have a pattern cast upon the back, and although to the eye no trace of it can be discovered upon the polished reflecting surface, yet when light is reflected by certain of these mirrors on to a screen, the pattern is distinctly visible in the luminous patch formed.

In a paper read before the Royal Society it has been shown that this is due to the polished side opposite the thinner parts of the casting being more convex than the others, a conclusion verified by the fact that the pattern is reversed when formed by a convergent beam of light. Such a condition of things would evidently result from a uniform expansive stress taking place over the reflecting surface, the thinner and consequently the weaker parts becoming more convex or less concave than the others. The authors have hitherto attributed this inequality of curvature to a mechanical distortion to which the mirrors are intentionally submitted during the manufacture, to produce the general convexity of the polished surface, but they now think it possible that the use of a mercury amalgam in the process of polishing may have an effect in the production of this inequality of curvature.

CONDITIONS OF CORROSION.—Speaking on the "Corrosion of Iron and Steel," Mr. T. H. Davis, F. I. C., formerly assistant at the Royal College of Chemistry and School of Mines, London, says if the air or water which surrounds iron contains carbonic acid, or any free acid, in minute quantity, the corrosion increases rapidly; but if a caustic alkali, such as potash, soda or lime, be present, the corrosion ceases altogether while any causticity remains, because oxygen and carbonic acid have greater affinities for these alkalies than for iron. He also points out that a perfect paint for the protection and preservation of iron and steel should be one which has a high mechanical adhesive property, and composed of such materials as are related electro-negatively to iron, mixed with some tenacious fluid vehicle containing little or no oxygen, and not capable of being decomposed by the iron beneath it. This would exclude most oily paints.

ARTIFICIAL AND SUN HEAT.—No explanation has been found of the familiar fact that, while both the light and heat of the sun pass unimpeded through glass, artificial heat is intercepted by this transparent medium. It is

strange that the heat of an ordinary fire should pass freely through a layer of rock salt, when it is unable to penetrate a pane of common glass; and it is worth observing that while the hot rays of the sun pass through glass with such perfect freedom, they cannot find their way back by the same channel. The warmth once inclosed in a hot-house cannot escape by the process that allowed it to enter the building; it must first heat the glass panes in the roof as it would any other substance, in order to get out again.

THE EARTH AS A TIMEKEEPER.—A problem, which is attracting to its study astronomers, relates to the earth as a timekeeper. We measure time by dividing either the period during which the earth revolves around the sun, or that in which it turns on its own axis. By the first method we measure a year; by the second, a day. The earth, according to some astronomers, is losing time. Through two causes—the sun's attraction and the friction, so to speak, of the tides—the earth each year revolves more slowly on its axis. The speculative question which these astronomers are discussing is whether in the end the earth will stop its revolution upon its axis and will present always the same face to the sun. When that event occurs, there will be perpetual day in one part of the earth and perpetual night in another. But there is no occasion for immediate alarm. The rate at which the earth is supposed to lose time only shortens the year by half a second in a century. There are more than 31,500,000 seconds in a year. Therefore, if the earth ever does cease to revolve on its axis, it will be more than 6,000,000,000 years before it will stop.

DISTRIBUTION OF EARTHY MATTER IN PLANTS. Berthelot and Andre have published their second, third and fourth memoirs on the general march of vegetation in an annual plant. They find that the mineral matters which become insoluble by incineration have a marked tendency to accumulate in the leaves. In plants with a languishing vegetation, however, they sometimes seem to be arrested in the roots, probably in consequence of the insufficient action of the agents which render them soluble, and enable them thus to reach the leaves through the circulation of the sap.

A PHENOMENON SELDOM NOTICED.—M. Treve has described to the French Academy of Sciences a phenomenon of a beautiful green ray which he has observed to follow the disappearance, for a quarter of a second after sunset, of the upper limb of the sun's disk. The flash of the ray is as quick as that of lightning, and can be seen only under unusual conditions of clearness of the sky. The author explains the appearance under M. Chevreul's theory of the simultaneous contrast of colors.

THUNDERSTORM IN A CLEAR SKY.—Captain Anderson, of the British bark *Siddartha*, which lately arrived in New York, reported a peculiar thunderstorm on April 27th, while on the northern edge of the Gulf Stream. The sky was quite clear at the time and the sun shining brightly, although there appeared to be a thin mist about the ship. Suddenly there appeared a vivid flash of lightning, accompanied by violent thunder. The compass was caused to vibrate perceptibly for a period of 15 minutes.

CLOUDS DEPENDENT UPON DUST.—Investigation by Dr. R. Von Helmholtz, described to the Berlin Royal Society, confirms the statements that the formation of cloud in saturated air is induced solely by particles of dust, and that the finer and sparser are the dust-particles the more slowly is the cloud formed. These results are also confirmatory of Prof. Tyndall's explanation that the blue color of the sky is due to floating dust.

JUPITER, THE GIANT PLANET, though 1200 times the bulk of the earth, is only 300 times its weight. Its bulk is largely made up of gaseous matter; but whatever that may be, its power for reflection are such that it is known to reflect nearly one-half the light that falls upon it from the sun. Its brightness, by some, however, that a portion of its light comes directly from the planet itself as a self-luminous body.

HEAT OF THE SUN.—In the focus of a burning glass, the sun's rays will melt the most refractory substances. The heat, then, of the sun is most intense. If we were as near to the sun as we are to the moon, the whole solid earth would melt away as wax.

WONDERFUL PROGRESS is being made in microscopical science, the president of the British Microscopical Society recently pointing out that results are now attained which mathematicians five years ago declared to be impossible.

THE HUMMING OF TELEGRAPH WIRES, according to R. W. McBride, is not caused by either the wind or by electricity, as is popularly supposed. It is accompanied by a rapid vibration of the wires and its origin is an unsolved problem.

THE POLAR SEAS.—A German physicist argues that the polar seas must be higher in summer than in winter, when the accumulation of ice increases the saltiness, consequently also the density of the water.

THE CRIMEA.—A thorough scientific examination of the people and prospective resources of the Crimea is to be made by representatives of the Russian Government.

ENGINEERING NOTES.

Railroad Building the Present Year.

It is appropriate at a time when general business depression and labor troubles are uppermost in the minds of most people to look away for a moment at an enterprise which forms an important factor in all business operations, and which regards such troubles with the keenest eye to the future. By so doing we shall learn that that factor is quietly shaping itself for an early return to an increased amount of business in the near future. We refer to the great railway builders of the country. Figures already published by the best authority show that during the first four months of 1886 railroad building in this country has covered twice the number of miles added in 1885. It is also confidently asserted that this comparative increase will hold good throughout the remainder of the year, and that at least 6500 miles of new road will be added to our present grand total before January 1, 1887. Moreover, during the same time the efficiency of our existing roads will be greatly increased by improving the tracks, etc.

Men interested in railroad progress estimate that during the year not less than 3000 or 5000 miles of existing railroad lines will be relaid with steel rails. One million tons of steel rails will be produced during the present year, of which 750,000 tons have already been sold. A million tons of rail will lay 10,000 miles of railroad track.

As a further increase of facilities for transportation, the 30th day of May was employed by the Louisville & Nashville road from Louisville to New Orleans in changing the gauge of the track to that of the standard width. The change in the track simply consisted in moving one rail three inches toward the other. All the inside spikes had been removed as far as possible and the ties prepared for the rail. Four or five men were detailed to each mile of the road and the great work was accomplished between daybreak and 5 p. m. The locomotives and car trucks had been previously reduced to the standard, for the former did not work well, frequently leaving the track and causing several minor casualties. A delay of 12 hours occurred in the Southern mails and freight in consequence of the change of gauge. It was thus that the Louisville & Nashville changed 1300 miles of track, all told, at a cost of about \$500,000.

Railroad building in this State has also taken a new start. The Southern Pacific is actively engaged in extending its track southward from Soledad to make connection with the main road at Newhall. The Los Angeles & Pasadena road is being rapidly extended eastward toward San Bernardino. Extensions and branches are also in contemplation on the San Gabriel portion of the Southern Pacific. Extra depot accommodations are also being made both on that and the Atchison & Topeka road at and near San Bernardino and Colton. The Northern Pacific is also being pushed forward toward Oregon; while it is in contemplation to push the Donahue road still further northward.

AERIAL NAVIGATION.—The French Academy of Science received, at its sitting of the 23d of November, an interesting communication from Captain Renard, on the subject of some experiments made by him with his navigable balloon. The memoir was received with great favor by the Academy, which decided that it should be inserted verbatim in the transactions, although this is contrary to the general practice. The motor employed was a Gramme dynamo-electric machine, developing 9 horse power. The current actuating the machine was furnished by a battery that constitutes the most interesting feature in the installation, but the arrangement of which is kept secret. The experiments have been repeated in the presence of the Minister of War, and it is said there appears little doubt that M. Renard's experiments, so far as they went, were a complete success. The Minister of War has ordered the construction of a much larger balloon for conducting experiments on a more extensive scale. These will take place this year.

RAILWAY MILEAGE IN CANADA.—It appears from statistics, recently published, that there are 10,027 miles of railway in operation in the Dominion of Canada, 2694 of which only are included in the intercolonial continental road. This amount of mileage compares favorably with that of any other country in the world, considering the difference in population and little populated territory through which the route runs. In addition to this extent of road, which is in actual operation, there is a considerable mileage on which track has been laid, and which will be open for traffic in the course of a few months, and there will be, undoubtedly, at least 11,000 miles of railway in operation in Canada by the 1st of July, 1886.

THE PANAMA CANAL was discussed at length in a recent Cabinet council, which finally decided to authorize the Panama Co. to issue a loan of 600,000,000 francs in shares, provided the company are able to prove that this sum is sufficient to complete the canal. The company, on the other hand, have decided to postpone the execution of all work not absolutely indispensable to the opening of the canal to traffic, and thereby fulfill the conditions required by the Government.

USEFUL INFORMATION.

OLD POSTAGE STAMPS.—A Parisian paper has set itself to discover what becomes of the old postage stamps—a question which has vexed the soul of many curious persons on this side of the channel. It was alleged that they were collected for the defrauding of the revenue, the postmarks being obliterated and the stamps reused. Obviously, however, the small scale upon which such a fraud could be conducted would not account for the millions of used stamps which were known to be collected by the convents. It appears that the convents convert their pupils and their pupils' parents into collectors, and when a million stamps have been amassed and sorted into countries and values they are sold to the dealers in foreign stamps, who pay from £14 to £16 per 1,000,000 for them. It is calculated that their retail sale and export to other countries leaves the dealer an average profit of £84 per 1,000,000. Philatelists will be interested in knowing, on the authority of our Parisian contemporary, that the one-franc stamps of the Republic of 1849 are now so scarce that they command about £3 each. It would seem, therefore, that a Frenchman might leave his children a worse heritage than a trunkful of old envelopes.—*St. James' Gazette.*

IMPROVEMENT IN MAKING WOOD PAPER PULP.—A combined chemical and mechanical process for the reduction of wood to fiber consists in first submitting the material to the action of chemicals, the next step being that of grinding. The wood is cut into blocks, much shorter than usual, or transverse saw scars are made at intervals across the ends, so as to aid the solution in permeating the fibers and loosening them. The wood is then put into a strong solution of lime, soda ash, chloride of lime, or other equivalent, and subjected to boiling under steam pressure for 24 hours. After the chemical treatment has been perfected the wood is removed from the tank or boiler, and is then subjected to the action of the grinders in the usual way, keeping a constant stream of water upon the stone. This effects the disintegration with great rapidity, owing to the preliminary treatment received by the blocks, and no washing is required beyond what results from wetting down the stone.

ECONOMIZING IN SUGAR MANUFACTURE.—The utilization in sugar-making countries of the residual caues, bagasse, for fuel and gas-making, is an important practical problem which has yet been only partially solved. The great obstacle has been the large proportion of water which it contains. It is stated, however, that a system has been devised of successfully dealing with the material. This result is obtained by a preliminary division of the pieces of cane in a special apparatus, whereby the after compression of the material by presses of any convenient kind may be usefully secured. The compressed material is formed into bricks by the addition of powdered fuel, ashes or lime. It is cited as a remarkable instance of the utilization of a waste product reacting upon the original value of the material that this conversion of waste sugar-cane into a useful fuel will render possible a special treatment of the cane which will result in simplifying processes, saving labor and increasing the yield of the raw article.

BEDS, NOW AND THEN.—Two hundred years and more ago the beds in England were bags filled with straw or leaves, but not upholstered or squared with modern neatness. The bag could be opened and the litter remade daily. There were few bedrooms in the houses of ancient England. The master and mistress of the Anglo-Saxon house had a chamber, or shed, built against the wall that inclosed the mansion and its dependencies; their daughters had the same. Young men and guests slept in the great hall, which was the only noticeable room in the house, on tables or benches. Woolen coverlets were provided for warmth; poles or hooks on which they could hang their clothes projected from the wall; perches were provided for their hawks. Attendants and servants slept upon the floor.

A CEMENT FOR RESISTING SULPHURIC ACID, even at boiling heat, may be made by melting caoutchouc at a gentle heat, and adding, with constant stirring, from six to eight per cent of tallow. Then mix therewith enough dry slacked lime to make the whole the consistency of soft paste; finally, add thereto about 20 per cent of red lead, whereby the mass immediately sets hard and dry. A solution of caoutchouc in twice its weight of linseed oil, aided by heating, and the addition of an equal weight of pipeclay, yields a plastic mass which will likewise resist most acids.

OIL FROM PINE WOOD is now manufactured on a considerable scale in the South. The material is subjected to intense heat in sealed retorts, and one cord of it is said to yield 15 gallons of turpentine, 80 gallons of pine wood oil, 50 bushels of charcoal, 150 gallons of wood vinegar, and a quantity of inflammable gas and asphaltum.

PAPER CIGAR BOXES.—Attempts have been made in Germany to make cigar boxes out of paper, instead of out of expensive woods, and the result is said to be very satisfactory. They are made waterproof by being covered with a

varnish, and the name of the firm and the quality of the cigars are put on the boxes during the process of manufacture. The advantages of these boxes are that they weigh little, last a long time, and cost little to produce.

HICKORY HANDLES.—A correspondent of the *Scientific American* asks: What will prevent worms from eating hickory handles? Answer: Most solutions adapted for this use are somewhat poisonous, and hence not adapted to handles. Creosoting or immersion in hot solution of carbolic acid, with some pressure after thorough kiln drying, would seem safe, and would be effectual provided it did not deteriorate the fiber of the wood. Linseed oil is recommended. Steaming will not prevent it, but will kill any that have begun operations.

THE UNSUCCESSFUL MEN are for the most part men who have not learned any business. If you find in a shop a mechanic—not a man who knows how to turn a stop-cock under his charge but a man who knows the whole mill—you will find a man who, as a rule, has never lacked employment and good wages.

LIME slaked with a solution of salt in water and then properly thinned with skim milk, from which all the cream has been taken, makes a permanent whitewash for outdoor work, and, it is said, renders the wood incombustible. It is an excellent wash for preserving shingles and for all farm purposes.

TURPENTINE IN WASHING.—A little turpentine in the wash-boiler will make clothes very white, and will often remove incorrigible stains from white goods. A tablespoonful of turpentine to a large boiler, or a teaspoonful to two gallons of water. There is no smell, the boiling preventing it.

TO CLEAN MARBLE, mix quicklime with strong lye, so as to form a mixture having the consistency of cream, and apply immediately with a brush. Let this composition be allowed to remain on a day or two and be then washed off with soap and water.

A HANDY SEWING MACHINE.—A "sewing machine which is held in the hand and worked like a pair of scissors" is made at Bridgeport, Conn., the factory employing 75 people, so says the *Boston Herald*.

DECEIT IN COFFEE.—It is said that 200 patents have been granted for machines to polish low-grade coffee and make it look like the best.

GOOD HEALTH.

Treating Cases of Injury.

Surgeon Valentine, of Brooklyn, N. Y., advises the following modes of treating cases of injury: In the case of one injured, but whose hurt was not positively known, he advised that the first act should be to send for a doctor; the next to loosen all tight articles of clothing on the patient, that the blood might have free course; the third act should be to place the injured person in as comfortable a position as possible, with his head low down if he looked pale or was faint, and finally to sprinkle the face and head with cold water. In ordinary injuries he said the dirt should be washed out of the wound, a wet linen placed on it, and then a bandkerchief or scarf tied about it to stop the flow of blood. In cases of hemorrhage he advised, if the blood flowed slightly, that the cut was not dangerous; that at most a small blood-vessel had been ruptured. But should the dark blood well out in a steady stream it was then evident that a large vein had been opened and that the flow should be stopped by pressure over the wound with the fingers or by some other ready means; but if the blood be of a bright red and spurted out of the wound forcibly and by jerks, an artery had been cut and the danger was great. If the hemorrhage was unimportant—that is, if immediate danger to life from the injury was not apprehended—stop the flow by pressure; but if it could not thus be stopped, bind the trunk of the artery between the heart and the wound and press firmly with the fingers. As, however, the hand soon tires in such cases, the next best thing to do is to put a tourniquet on it. [A young man from the audience was called to the platform and the method of using a handkerchief with a stick or bayonet as a compressor was shown.] Simple and compound fractures were next taken up. A simple fracture, he said, was where the skin was not broken. When a bone was broken the fact could be ascertained by any one whose head was cool and whose nerves were steady. In the first place, the limb was shortened; next, there was an unnatural movement at the seat of fracture; then there were violent pains, and lastly, the ends of the bones grated against each other if the patient were not immediately placed in an easy position. Dislocations were at once seen by the altered appearance of the joint, by the mobility of the loosened bones and by the effort to move the joint causing intense pain. The treatment was to promptly replace the joint, but this could only be safely done by a surgeon.

DIGESTIBILITY OF CHEESE.—Of 18 varieties experimented with, Cheddar was digested in the shortest time (four hours), while unripe skim Swiss cheese required ten hours for solu-

tion. There is no difference in the digestibility of all sorts of hard or soft cheese, but all fat cheeses are dissolved the most rapidly, because, being open by reason of the fat, they are the more readily attacked by the solvent. There is no connection between the digestibility and the percentage of water present in the cheese, but there is some connection with the percentage of fat and the degree of ripeness. From examination of the quantity of nitrogen dissolved, the author concludes that, on account of its great digestibility, cheese is the most nourishing of all foods, meat and eggs excepted.—*Jour. Chemical Society.*

The Ordinary Vest a Poor Lung Protector.

Mr. James Hess makes a very sensible suggestion, it seems to us, in the *Herald of Health*, when he calls attention to the absurdity of our present curious habit of wearing cambric-back vests, while the fronts are of heavy material and sometimes wadded, and urges the propriety of protection for both sides of the lungs. The habit of course has grown from a belief that the outer coat is sufficient protection for the back, while the chest needs warmer covering on account of the coat being open. But it seems a disproof of the reasoning that the first unpleasant sensations of chilliness are the so-called "creepers" running down the spine. Even when the warmest woolen material is selected for a suit, the tailor, unless otherwise ordered, will invariably make the back of the vest of some thin, flimsy material, like cambric or silk, though he may deem it advisable to pad the front with cotton wadding. There is no proper reason why the back of the vest should be made so insufficient. The front may be made uncomfortably thick and still fail to protect the lungs, unless the back is made equally thick and warm. In front they are protected about five times as much as in the back by clothing, ribs, flesh, muscle and fat. In the back, the lungs almost come to the surface, and therefore need more protection. Mr. Hess asserts that it has been his custom for two years past, and that many gentlemen to whom he has mentioned the matter have had their vests made with good, warm backs, and after a winter's trial are quite enthusiastic over the change.

They have passed through the entire winter and spring without once taking cold, which is the best evidence in support of the thick vest-hack proposition that could be adduced.

THE TONGUE IN DISEASE.—One of our medical contemporaries states that the different complaints are indicated by the condition of the tongue, as follows: A white-coated tongue indicates febrile disturbance; a brown moist tongue indicates disordered digestion or overloaded prime viæ; a brown dry tongue indicates depressed vitality, as in typhoid conditions and blood-poisoning; a red moist tongue indicates debility, as from exhausting discharges; a red dry tongue indicates pyrexia, or any inflammatory fever; a "strawberry" tongue with prominent papillæ indicates scarlet fever or rotheln; a red glazed tongue indicates debility, with want of assimilative power of digestion; a tremulous, flabby tongue indicates delirium tremens; hesitancy in protruding the tongue indicates concussion of the brain; protrusion at one side indicates paralysis of the muscles of that side.

REMOVAL OF WARTS.—A correspondent of the *Therapeutic Gazette* announces through its columns the virtues of castor oil in the removal of warts. Constantly applied for from two to four or six weeks each day—that is, once a day—it has not failed in my hands, says the writer, in any case of any size or long standing. The time it takes may try the patience of the user, but if faithfully used they will get their reward in the removal of the wart without leaving any scar. I have used it with some success in other growths, and had benefit enough to merit further trial. It might, he adds, be a success in the removal of certain kinds of cancer, especially scirrhus forms.

FROG'S SKIN ON MAN.—Skin from the back of a frog has been used by Dr. O. Petersen for hastening the healing of wounds. Grafts of the size of the thumb-nail were caused to firmly adhere in two days, and in two days more the pigmentation of the transplanted skin had almost disappeared. The resulting cicatrix is of great softness and elasticity. Some of the London hospitals are now beginning to employ frog's skin as grafts in place of other skin.

BURNT COFFEE FOR WOUNDS.—Dr. Oppler, of Strasburg, has discovered in burnt coffee a new antiseptic dressing for wounds. The action appears to be two-fold; first, that produced by burnt coffee as a form of charcoal, and secondly, that which is due to the pungent aromatic odors, which are fatal to the lower organisms. As coffee is always on hand in military expeditions, it will be especially serviceable as a dressing during war times.

GALVANIC PLASTIC EMERALDING.—M. Kergovat, of Brest, is the inventor. The body is coated with plumbago and placed in a bath of sulphate of copper connected with a battery. The body becomes thus incased in a skin or plate of copper, which entirely prevents decomposition. Over this may be applied a second plating of gold or silver.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador *Ledger*, June 5: The Iowa Company has purchased a 10-stamp mill, at Angels, Calaveras county, and is now engaged in moving it here, to erect it on its claim in place of the five stamps heretofore in operation. The stamps are 750 pounds, with double discharge batteries, and the ten stamps are calculated to crush from 20 to 25 tons per day. The mill is almost new, having been used but about three months. It was formerly used at the Bechtel mine, but was discarded on the erection of a larger mill with heavier stamps. The object of the Iowa men in this purchase is to crush the surface rock and dirt, the same as Mr. Stewart is doing at the Lincoln, with gratifying success. The Canal Company is taking up 700 feet of 15-inch pipe that has been used in conducting water to the Mahoney and Lincoln mines, and laying the same from its ditch near the Kennedy, to intersect the Monterichard ditch, for the purpose of conveying water to the Live Oak mine, near Stony creek, owned by Harris and others. They have just had a two-stamp mill built at Donnelly & Howard's foundry, which will be placed in position in a short time. The Amador Consolidated Company has purchased an air compressor to run the Burleigh drill. It is a large machine, weighing something like five tons.

CLAIMS BONDED.—Reginald W. Petre, a capitalist of Duluth, Minnesota, this week bonded from Mrs. A. J. Sargent the Marlette and Sargent quartz claims at Middle Bar, comprising 2700 feet along the vein. The aggregate amount of the bonds is \$28,000—\$25,000 for the Marlette and \$3000 for the Sargent claim. The term of the bonds is six months. Mr. Petre was here in person attending to the business, but left as soon as the matter was consummated. The short period of the bonds induces the belief that something will speedily be done toward a thorough prospecting of these promising locations.

MISCELLANEOUS.—The Tellurium mill was started again this week. A quantity of pipe, 500 feet, made by Hewitt Bros., was sent to the Live Oak claim, two and a half miles west of Jackson, this week. The ledge in the Gover is said to be from 10 to 14 feet in width. In this vast lode there is a four-foot seam of exceedingly rich quartz, the assay value of which runs up into hundreds of dollars per ton. The mill is being placed in a thorough condition of repair, preparatory to being started on a long career of activity. It is expected to resume work this week. A brick valued at \$4800 was shipped from the South Spring Hill this week, the product of a week's run, exclusive of sulphurets. The tunnel which has been run from the side-hill facing the road has made connection with the shaft. The last dividend of Plymouth Consolidated Mining Company, payable this month, was 25 cents per share. The gravel claim of the Hall boys, near Volcano, has turned out very satisfactorily this season. A cleanup made a few weeks ago, comprising a month's run, realized over \$300; the output of last month is expected to reach at least double that sum. At the St. Julian the mill is idle on account of the breaking of the cam shaft. The tunnel is now in 500 feet, and the air had become so bad as to interfere seriously with the prosecution of work. Improved air-pumping apparatus is now being put in. The Zeile reservoir broke this (Friday) morning, pouring all its contents into the creek, and bringing the mill to a standstill. It will take several days to repair damages.

Calaveras.

SHEEP RANCH.—Calaveras *Citizen*, June 5: "It is the prettiest rock I ever saw," said an experienced miner the other day as he held in his hand a piece of the quartz which had just been taken out of the "Hard Scramble mine" near town. "The beauty of the ore amounts to nothing," explained another; "what we want is gold, no matter what it comes in; whether it is found in glass, petrified wood, quartz or charcoal, so long as we get the metal we are satisfied." The ore at present being found in the above mine is of the finest appearing quality, much resembling the rich ore from the Sheep Ranch mine. It contains much sulphurets, galena, and other metals usually found accompanying gold in quartz. However, not a single color can be obtained by the honor, or any be discerned by the eye. The opening of the ledge is one of the best and affords much encouragement to Mr. Smith, who is doing the work. He says he will run the tunnel to Lava Hill or find something. The tunnel is now in about 325 feet, while everything indicates that there should be a good gold-bearing quartz lode there.

El Dorado.

INDIAN DIGGINGS.—Placerville *Observer*, June 5: A. L. Hale, of Indian Diggings, spent a few days at the county seat the past week. He says the recent cleanup at the Hale & Baughman mine was quite satisfactory. The Chic and Ohio mine, Cosumnes township, will be started up next week by the owners—the Parker brothers. This mine has recently been idle, though it has paid well in the past.

Mono.

THE STANDARD CON.—Bodie *Miner*, June 7: Number of men employed in and about the mine, 45. Ore bodies in mine without special change. Ore shipped to mill for the week, 285 tons. Mill was closed for repairs from midnight of Sunday, May 30th, until 7 A. M. of Tuesday, June 1st, but has since been running steadily. Bullion valued at \$723.23 was shipped on June 2d.

THE MONO.—We shipped to the Bodie mill during the week 150 tons of good ore. There were employed 16 miners, two carmen and one blacksmith's helper, and jointly with Bodie Con. two engineers, one carpenter, one carman, one fireman, one miner, one watchman and one foreman.

THE BODIE.—We are taking out ore from the old incline stopes. There were employed four miners and one blacksmith, and jointly with Mono two engineers, one carpenter, one carman, one fireman, one miner, one watchman and one foreman.

THE CON. PACIFIC.—The drift on the Fortuna vein, between Nos. 1 and 2 ledges, has been advanced six feet. Total length of drift, 84 feet. The vein is looking well in the face of the drift. The winze on the 135-foot level has been sunk during the week five feet. Total depth, 31 feet.

THE BODIE TUNNEL.—The south drift, 300-foot level, advanced nine feet; north drift, 400 level, advanced six feet. The ledges in all the drifts look favorably.

Nevada.

NORTH BLOOMFIELD.—North San Juan *Times*, May 29: While at North Bloomfield we learned from a reliable source that the managers of the North Bloomfield mine had given orders to close down the mine and stop all proceedings of every nature and kind; and while at the Derbec we heard it rumored that the North Bloomfield Company had given orders to turn off the water from the Derbec and De Noon mines. This information was only rumor and did not come from any reliable source. It needs confirmation to warrant its belief. To turn off the water from the Derbec would be a great calamity. It would throw out of employment over 150 laborers, many of whom would go forth without a dollar in their pockets, and it would well-nigh ruin many others who are now eking out an existence in that section of the country. We trust the rumor was not based on anything like fact. The probabilities are that the North Bloomfield Company will get up machinery in the near future to work their ground by the elevating process. This they can do without much expense, but whether it will pay is a question yet to determine. The North Bloomfield people are hopeful, and Micawber-like, are waiting for something to turn up.

DELHI.—Sunday, in company with Mr. E. Spofford, of North Columbia, we made a trip to the Delhi mine, which is situated near the Middle Yuba river, on the north side of Grizzly ridge, about three miles south of Pike City. The road to the mine from Columbia hill is a very good one considering the fact that a person, to reach the mine, must descend to the bottom of Grizzly canyon, then mount to the summit of Grizzly hill and then down again to the mine; the ascent and descent being a thousand feet in a distance of less than four miles. As our readers are pretty well informed as to the mine, it is unnecessary for us to describe it; suffice it to say, it is at the present time crushing some very rich rock obtained from a small vein or lode near the Delhi, named the Puzzler. The Delhi Company are pushing work on the 500-foot level; until that tunnel is completed they will have but little rock to crush for the Delhi lode, as the rock between the 300-foot level and the upper tunnel has petered out.

CROWN POINT MINE.—*Tidings*, June 5: The Crown Point mine has been reported as sold several times, but there is no truth in the report. Mr. Gauthier, owner of the mine, is now in San Francisco, talking business to some parties who are bargaining for the mine. Those parties will be in Grass Valley the latter part of this week, and they will go down in the mine, make a thorough examination of the ledge as stripped, and if they find the property as good as represented they will purchase it.

WASHINGTON TOWNSHIP.—Nevada *Transcript*, June 5: In mining matters there is little to record, except that the Eagle Bird mine continues in a very rich body of quartz in its south drifts on the third and fourth levels. So rich is it in these drifts that it brings the average of the whole mine to something over \$30 per ton. As the expense of mining and milling ranges from \$2.50 to \$2.75 per ton, the margin for dividends will be seen to be quite handsome.

PONY GULCH ITEMS.—Coeur d'Alene *Record*, June 2: R. G. Lang is over from Pony gulch to-day. In conversation with the reporter he spoke glowing terms of the quartz prospects of the gulch, and said that considerable excitement has been occasioned by recent discoveries. Already there has been quite a strife to secure locations. Ingram, Lang & Co. recorded four locations to-day, and a water right that is likely to prove of considerable value. Lately several pieces of marvelously rich gold-bearing quartz have been found. One is said to contain \$46.00. Ward Brothers have ceased hydraulic operations for the season and have commenced cleaning bed-rock. They have a pit stripped fully 200 feet long which it will take them several weeks to clean. Their claim is rich and easily worked, they having reached a point where bedrock is only six feet below the surface. All the gravel prospects well and there is every reason to believe that they will have a big cleanup. Above them Strait & Williams are doing good work and getting good pay. Their ground is also shallow and nearly all the gravel pays well. Occasionally pieces of gold are found containing considerable quartz showing scarcely any indications of wash, the belief being quite general among the miners there that they come from a rich lead near by. Reese Williams, who was lately obliged to lay off a few days on account of an injury received, and spent part of the time in Murray, has returned to work. They have water enough to admit of sluicing operations all summer. Ingram & Co. have their 600-foot flume completed, but the water is too low to admit of piping operations this year. They are well prepared to take advantage of the next high water. Meanwhile they and the parties interested with them will begin the work of developing the McCloud and Columbia leads, two of the most promising quartz prospects of the south side, both of which we have previously described.

MOORE'S FLAT.—Nevada *Transcript*, June 8: At the Metropolitan quartz mine, which is superintended by J. Rodgers, the 10-stamp mill is running daily and the supposition is that the rock is yielding handsomely. If it proves a paying mine, Moore's Flat will be one of the lively towns of the county. Messrs. Vond & Hart are still taking out rich-looking ore from their mine at New York ravine. There is no doubt that the clattering of a 10-stamp mill will be heard there before the year is out. McKillican & Co.'s river quartz mine is still yielding handsomely.

Inyo.

KEYNOT.—*Independent*, June 5: John Anton has leased the Keynot mine, Beveridge district, from M. Lasky. Ten men are now at work in the mine. Before the mine was leased it was worked by tributaries. One of these worked ten tons of ore that yielded \$104.20 a ton; another took out 88 tons of the average value of \$68; and a third worked 28 tons that went \$78 a ton. Forty-seven tons of refuse ore

from the dump yielded \$19.25 a ton when milled. The poorest worked ore from the mine milled \$37 a ton.

ORE SHIPMENTS.—The last shipment of ore from the White hill mine netted Barnes & Kehoe, now the sole owners, \$124 a ton. This is a pretty good margin above expenses. Another shipment is nearly ready. Reube Spear has been at work for some months about a mile and a half from the White hill mine. He will make a shipment of ore in a few days, and has a very good prospect.

San Bernardino.

HOPE SPRINGS DISTRICT.—*Calico Print*, June 5: A. G. Rhodes brought in some specimens from the Black Metal mine, in Hope Springs district, in the southeastern part of Death valley, taken from a quantity of ore that samples 150 ounces to the ton. In the last few weeks the shaft on this mine has been sunk 15 feet deeper, and is now 30 feet in depth, with good ore in sight, the ledge being two feet wide. Owing to the hot weather it will be necessary to suspend work on the mine until fall, when it will be resumed with renewed energy by Mr. Rhodes and his partners, who believe that they have a good mine. Should the Carson & Colorado Railroad be extended southward through the great mineral belt that traverses the northeastern part of San Bernardino county, it would naturally pass within about two miles of the Black Metal mine, and also be the means of rapidly opening up the fine prospects in that district as well as the many others along its line.

Shasta.

BULLYCHOOP.—*Shasta Courier*, June 6: This district, which lies partly in this county and partly in Trinity, is coming to the front pretty lively as a quartz mining camp. One mill is now running there, and turning out bullion, and two other mills will be in operation in the near future. The miners of that district have long labored under difficulties that would have disheartened any people except California miners. In the mountain wilderness, and no mode of ingress or egress except trails that would make a Rocky Mountain sheep hesitate to travel, the persevering men of that camp held on to their mines and resolutely kept their faith pinned on Mount Bullychoop. Finally capital came to their aid; Captain Potts and Senator Charles Foster, owning mines there, built a wagon road from Sunny Hill district to the Mount, and by this enterprise, machinery and supplies could be brought in with facility. Activity and life pervades the district, and the numerous and almost inexhaustible lodes are greatly enhanced in value. The Bullychoop, Sunny Hill and South Fork districts are naturally tributary to Anderson and Cottonwood as railroad shipping stations, and these towns will now feel the exhilarating effects of the new era which has come like a benison upon the miners and mine-owners of western and southwestern Shasta.

Sierra.

HOW IT IS TURNING OUT.—*Tribune*, June 5: T. H. Smith is striking it rich in his quartz ledge at Alleghany. He has several men at work pushing ahead developments, and by crushing ore in a hard mortar secures enough gold right along to more than make both ends meet. Last week Smith was at the county seat negotiating with the foundrymen for a Forbes crusher. When that mill is put at work grinding up the ore our friend will have more gold than he can conveniently handle. We are reminded, by the way, how short a distance a man can see underground, and how a life-long miner may sometimes be at fault in his opinion concerning quartz ledges. This same claim which Mr. Smith is now clearly demonstrating to be of value, lay for years without anybody taking the trouble to locate it, much less doing any work on it. When the present owner did go and post a notice and begin work where it had been abandoned years before, many old miners smiled incredulously, and remarked to one another that the "fool-killer" had work yet to do. Smith did not get discouraged, however, despite the opinions of others, and, single-handed and alone, kept hammering away on his tunnel with as much spirit as though every man in the country had assured him that a ledge of solid gold would be the reward of his efforts. The result has not quite equalled that, but still, Mr. Smith has sufficient reason to congratulate himself that he depended entirely upon his own judgment.

WILL HAVE A GOOD MINE.—Thomas Bessler came down Monday from Butcher Ranch. He reported that the work of driving ahead on the True Blue was progressing favorably and that the vein prospects better every day. The boys are confident of opening up a good mine there, and according to all accounts we believe they will.

SIERRA CITY.—*Sierra Tribune*, June 5: Mining operations are becoming more active in this district every day, and the industry was certainly never more promising than now. Everything indicates that the most sanguine hopes of our people will be fully realized. Already this district can be classed among the richest and most prosperous quartz-mining sections of the coast. Below will be found the latest mining news: At the Young America mine the carpenters are busily engaged on the work of adding another ten stamps to the present 20-stamp mill. As soon as these are ready for operation still another ten stamps will be added to the plant—making 40 stamps in all. There is enough ore now in sight in the mine to keep that number of stamps crushing for years to come. At the True Blue claim the tunnel has been run in on the vein 120 feet. In the face of the tunnel the ledge is 5 feet wide and shows a fine character of gold. This claim is on Butcher ranch ridge and the company which owns it was recently incorporated. In the Phoenix tunnel a change in the character of the ground has been encountered within the last few days, and the rock is becoming somewhat mineralized. It is expected that the ledge will be reached the latter part of this month. A party informs us that a few days ago A. Bates and Tom Williams located a quartz ledge in Lady's canyon, about one mile above the Downieville road, which is considered an important discovery. The vein runs northwest and southeast, is from 4 to 6 feet in width in the croppings, and has been traced by the locators for a distance of 4500 feet. The gentleman who gave us this information prospected some of the rock and found it very rich in free gold. The raise of 108 feet from the tunnel to the surface, at the Mercer & Celina quartz claim, was completed

a few days ago. Fine prospects were encountered in the raise. The tunnel at the Brandy City mine has been run 1350 feet up to last week. A raise (for air and drifting purposes) is to be put through to the surface, a distance of 200 feet. Not a Chinaman in any capacity is now employed at this mine. Many other mine-owners at adjacent camps would be doing the right thing if they would follow brother Lawrence's example in that respect. The Rocky Peak Gravel Company, whose claim is located in the Brandy City district, is about to let a contract for running 200 feet of tunnel. They have already run 500 or 600 feet into the hill, and we understand have encountered some very flattering prospects. P. R. Gardner was up from Downieville, Monday, and paid this office a friendly visit. Mr. G. did not have anything very startling to report from the seat of war. He did state, however, that himself and partners had not taken any bullion this winter from their quartz ledge at Poker Flat. Mr. Sutherland, who is interested in the Lindsay claim, at the same camp, is below, endeavoring to raise some money for a working capital. His plan is to erect a stamp mill, providing he can muster the necessary "wind." A 20-foot-high rock dam is being built at the upper Sardine lake by the Young America Company. The structure is a fine piece of engineering skill, and when completed will back up an immense body of water in the lake. Neither expense nor care is being spared in making the dam as solid as the earth itself. T. Berger will very shortly resume operations at his quartz claim.

Tuolumne.

SOULSBY.—*Independent*, June 5: The rich chute of ore struck in the Soulsby mine is increasing in width, having already widened from 8 to 15 inches. It is so rich that those interested say they "could not wish it better." The Soulsbyville people feel jubilant over the big strike, which means good times for everybody there.

THE HYDE MINE.—This mine was last week visited by the San Francisco parties who hold it under contract of sale with the owner, and are working it with vigor and determination to fully develop it. The mine has lately shown such improvement that a mill will soon be placed on it.

NEVADA.

Washoe District.

HALE AND NORCROSS.—*Enterprise*, June 5: On the 2900 level the main lateral drift northward has reached within 100 feet of the Savage south line, and its face is in strongly mineralized quartz and vein matter. A crosscut (No. 6) will be started west from it to-day or to-morrow to explore the ore vein which lies west of the lateral drift. Nothing is being done in the explorations above the 3100 level at present. The drift south from the bottom of the deep winze on the 3200 level is now in 75 feet, following along the east wall of the ore vein toward the Combination shaft.

CHOLLAR.—Good work continues to be done sinking the Combination shaft deeper, and it has now attained the depth of 3222 feet, surpassing in that respect all other vertical mining shafts in the world. The bottom is in vein matter, quartz, porphyry and clay, showing no particular change since last week's report and no increase of water. As soon as sufficient depth is attained for a sump a station will be opened at the 3200 level for a lateral drift north to connect with the bottom of the Hale and Norcross deep winze on that level.

POTOSI.—Diamond drill hole No. 4, on the 3100 level, penetrated east 175 feet, and was discontinued. It passed through about 80 feet of solid quartz. The drillings showed not only strong silver mineralization but a considerable amount of iron sulphurets. Some water came from it, therefore after the drill was withdrawn the hole was securely plugged. Another drill hole is to be started to-day about 75 feet further north, the ground being apparently dryer in that direction.

SIERRA NEVADA.—West crosscut No. 2, on the 520 level, had 15 feet added to its length, making a total of 584 feet. Its face is still in barren quartzite and porphyry, with a little water. It will be advanced no further west at present. Two lateral drifts north and south have been started from it at an eligible point in the vein matter 170 feet from the main north lateral drift. Each of these drifts is now in 23 feet.

CON. CALIFORNIA AND VIRGINIA.—Daily yield, about 400 tons from the various working levels on the 1780 up to the 1200. This ore is all low grade, averaging according to battery samples at the mills, about \$13.50 per ton. A station has been cut out at the C. and C. shaft on the 1400 level and a drain cut throughout the floor of the drift, preparatory to taking out ore through it from that level.

BEST AND BELCHER.—During the week the water has been reduced 23 feet in the shaft, and only 26 feet more remains to be reduced in order to reach the track floor of the 2319 or bottom level. The drainage of this level will be necessarily slow, owing to the drifts being full of water as well as the shaft. As before stated, this bottom level corresponds with the 2500 level of the C. and C. shaft.

SAVAGE.—The main south lateral drift on the 600 level from the Gould and Curry mine is now in 140 feet, and a crosscut east has been started from it to explore the vein in that direction. Thus far the material passed through on this level has been of a character very favorable for the finding of good pay ore.

GOULD AND CURRY.—On the 500 level the west crosscut from the upraise is now in 60 feet, 34 feet having been added during the week. It is all the way in low-grade quartz. An incline has been started from the head of the upraise on this level, which is now up 30 feet on the slope.

YELLOW JACKET.—The old ore stopes and breasts hold out well and yield their regular 140 tons of ore per day, keeping the Brunswick mill running to its full capacity.

ALTA.—The main lateral drift north on the 700 level has not yet reached connection with the old Lady Washington workings, but is expected to do so during the coming week.

MONTE CRISTO.—The main west drift on the 150 level from the new shaft is still advancing. The ground works more favorably.

CROWN POINT AND BELCHER.—About 380 tons

continues to be the daily output of ore from the old workings, from the 1750 level upward.

KENTUCKY.—Daily yield, 60 tons of low-grade ore from the old workings from the 1300 level up.

Columbus District.

HOLMES.—*True Fissure*, June 5: In the ninth level, about 100 feet west of the copper stope, in the crosscut, we have a fine development. This development is now called the Murphy ledge. It is north of the main ninth and west of the copper stope. At this point we have a large amount of unprospected country. When we first cut this ledge we got some very high assays, but they were from small bunches and did not amount to anything except to give us confidence in the ledge. After running east in the ledge a distance of 25 feet we started a raise on a small streak of good ore. This streak has developed into a fine ledge. It is now three feet wide and the average assays from it are \$60 per ton. This is a ledge that has never been cut in any of the upper levels of the mine. The sulphuret winze is producing well, but it is not quite as large as it has been. The hot stope looks exceedingly well. It is improving rapidly and the ore is high grade. The rock around it is hard and progress is slow. The stope below the west drift on the fifth level is giving some \$70 ore. The intermediate stopes between the fourth and fifth levels are looking about the same and giving considerable ore of fair grade. The west drift on the fourth level shows about 15 inches of \$50 ore where we are stopping. The intermediate stope below the east drift on the third level is looking well, and turning out some \$80 ore. A small amount of \$100 ore is being taken from above the east drift on the third level. The east stope on the second level shows a good bunch of \$60 ore. The stopes above the second level are looking about the same and yielding considerable ore. Bullion shipment May 26th, \$10,168.68.

Eureka District.

A PROMISING DISCOVERY.—*Eureka Sentinel*, May 29: Word was received in town last night that a strike of considerable importance had just been made in the Alexandria mine, on Prospect mountain. It appears that at a certain point on the 200-foot level good ore had been discovered and taken out to quite a depth. This was several months ago. It was deemed advisable by the management to run a drift underneath the body from the 300-foot station. A survey was accordingly made by Surveyor Parry, and yesterday evening the interesting ground was tapped and ore of even a better quality than that above was discovered. Unless the management is very much mistaken, it has a body of at least 100 feet in depth of good smelting ore.

ORE SHIPMENTS.—*Eureka Sentinel*, June 5: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Eureka Con. works—Rescue mine, 30 tons; Summit, 9; Lawson, 1; Reville, 2; Silver Lick, 28½; Lone Pine, 2½; Paul, ½; Jackson, 22; Silver West, 2½; Dunderberg, 10; Lord Byron, 9. To the Richmond works: Albion mine, 2 tons; Altoona, 11; Macon City, 2½; Dehman, 1; Bullwhacker, 25; Continental, 4; Grant, 8; Prospect Mountain Tunnel, 25; Eureka Star, 2; Williams, 50; Copp, 1; Union and Charleston, 2; Hamburg, 50.

Monnt Hope District.

ASSAYS.—*Eureka Sentinel*, June 2: Hon. Thos. Wren had some more assays made yesterday of ore that he brought in from his Mt. Hope mines Thursday evening. He was especially interested in the assay of one sample, inasmuch as he has considerable of the ore in sight in the mine and a number of tons of it on the dump. It is heavy in lead and went \$30 a ton in silver. If there is anything at all in indications, large shipments can be looked for from Mt. Hope this summer and fall.

Reese River District.

AT AUSTIN.—*Virginia Enterprise*, June 3: The Manhattan mill, at Austin, will start up for another run shortly. The dumps of the tributaries, as well as those of the company, have become pretty well filled, and in the various stopes and breasts of the mines good working openings are made, insuring a good run of the mill for some months. And be it understood that this is no low-grade ore proposition, but, like all similar runs of that mill, it means a yield of from \$200 to \$1000 or more per ton. The other veins are small but exceedingly rich in that locality. The above information is from well-known mining gentlemen of Austin, who are in on a brief business visit to the Comstock.

Silver Peak District.

TO BE REOPENED.—*Walker Lake Bulletin*, June 4: The valuable Silver Peak mines will soon be reopened on a large scale. Those rich ores can be handled profitably since methods have been improved and transportation has been cheapened. Many years ago, when it cost a fortune to haul a load of supplies to those mines, they were worked extensively; but although the ores were very rich the expense of mining and reduction consumed the profit. As the conditions are now changed in all respects as to cost, the result of the present renewed venture may be predicted as highly successful. The ores of the section are both rich and plentiful, and with everything connected with their extraction and working made cheaper and easier, the company, which is taking the mines in hand, undoubtedly has before it a wide margin of profit. Mr. R. B. Catherwood, President of the New York and Silver Peak and New York and Palmetto Mining Companies, is now here and is urging affairs to as early a resumption as possible.

AT WORK.—*True Fissure*, June 5: John Chiatovich, of Silver Peak, was in town Thursday. He says that there are about 20 men at work in the Drinkwater tunnel, which is being run to connect with ore found in the Sentinel mine. As soon as the connection is made the work of developing the mine will be begun this tunnel will make the development work in nearly all of the mines at the Peak comparatively easy.

Pioche District.

FAVORABLE PROSPECT.—*Salt Lake Democrat*, June 3: There is a favorable prospect for the town of Pioche, near the Utah line in Nevada, again blooming forth into something like its former importance and glory. Mr. W. S. Godbe, of this

city, has purchased the once celebrated Raymond & Ely and Meadow Valley mines, which have been consolidated under the one incorporation, and which will be jointly worked in the near future. These properties have been lying idle for years. The Meadow Valley became involved in law, which caused it to close down, and the stoppage of its pumps forced the suspension of operations in the Raymond & Ely, which is an adjoining claim. Both at one time were the greatest bullion-producers in the State of Nevada, and at the time of their closing down the prospects were decidedly favorable in each for developments which would restore them to their former standing. There is a large amount of unprospected ground at and above the depth of the lowest workings, and any blast or stroke of the pick is liable to expose such a body of ore as in the flush times gave these mines and the district a world-wide reputation. We understand from reliable sources that active operations will be commenced at an early date, and upon a scale which will insure the most thorough development of the resources of the property. After all these years of inactivity it will be gratifying to note the booming up again of the old camp into something like its former proportions and importance. This is likely to occur, and through Utah perseverance and enterprise.

ALASKA.

MINING OPERATIONS.—*Alaskan*, May 22: The weather we have been having is unprecedented in Alaska, and old residents declare that never in their experience have they seen such a spring in this country as the present one. Snow falling the 20th of May is something unheard of in this "land of the midnight sun," and we are inclined to believe that in the mountains there is more snow to-day on the ground than there was on the first day of April. This state of things greatly retards mining operations of all kinds in all parts of the Territory—it must very greatly delay the prospectors who have started and those who anticipate starting for the Yukon country. It has delayed the work on the claims at the head of Silver Bay at least two months. In spite, however, of all obstacles and difficulties with which they have had to contend, the Lake Mountain Mining Company is progressing with its work very satisfactorily and is developing its properties as rapidly as could be expected under the adverse circumstances. Mr. Fuller, the manager, spent a day or two at the Lucky Chance the first part of this week, and informs us that he now has most of his material on the ground, that he has no difficulty in obtaining all the Indian labor that he desires and that they do their work to his entire satisfaction. He expected to be able to wash the placer ground by this time, but says on account of the unusual amount of snow it will be the middle of July before the water can be turned on. The pipes are now being made, and if the snow will let up he thinks his prediction of the time will not be far out of the way. It is difficult to believe, but nevertheless it is a fact, that the snow in the mountains is now from 10 to 15 feet deep, while in the gulches and canyons it can be found varying from 25 to 60 feet in depth. While such a condition of affairs has never been known before, the hope and probability is that it will never occur again. The first blast in the tunnel of the Lucky Chance was fired May 7th, since which time the men have been steadily at work, and have driven the tunnel 15 feet in eight days; men are also at work in the shaft. The moment the weather will permit the company will put men to developing the other ledges which belong to its proprietors, and the confident belief of the manager is that they will be found to be as rich as the Lucky Chance. In fact the Nichol Lode is an extension of the last-named ledge. The developments at the head of Silver Bay prove, beyond doubt, the richness of the quartz veins in that district, and demonstrate the fact that mining interests on this island are in their infancy as yet.

ARIZONA.

WEAVER DISTRICT.—*Prescott Courier*, June 3: Col. H. A. Bigelow and Mr. J. A. Park arrived recently from Weaver mining district. The Colonel says there are in the district about 80 miners, a majority of whom are Mexicans. Water is becoming scarce. The dry washing machine has a capacity of 10 or 11 tons per day. It is at work all the time on gravel that pays from three to ten cents to the pan. It is a slow and costly mode of getting out gold, and people down there hope that the Bates or some other company will hurry up and bring in water to wash the rich gravel, of which there are thousands of acres.

SIGNAL.—*Cor. Prescott Courier*, June 3: The Peabody mill closes down to-morrow to enable workmen to place in the concentrators and other additions to the mill. This may require seven or eight days, and then the mill will resume its steady output of bullion. John Colyer is the superintendent of the mill, and his energetic way of pushing work, aided by a good crew of men, will make the delay for repairs very short. Several mining men from California and other parts have been visiting Signal in the last few days. Some of them have visited the new strike and declare it to be a big thing. Mr. Riley, of this place, staked two men to go out to the new strike some four weeks ago. One of the party came in here on the 22d inst. after Riley, claiming that they have found property adjoining the Black Metal mine that was equally as good as it is. If this is so, our little place here is fortunate in owning such a citizen—the locator of the biggest silver strike made for a long time in any place or country. I would say, now, that it is useless for men of no means to go there for the reason that there are more men there than there is work, and the weather is so extremely hot that but little work and no prospecting can be done. The distance from here is about 45 miles west, and many men who could not obtain employment at this place have gone to the new camp to add themselves to a large number of broke men already out there. Those who have employment in your county had better remain there and not quit a situation to hunt one out this way, for work is not easily obtained now, and when it is found the wages are very low.

COLORADO.

CRESTED BUTTE.—*Elk Mt. Pilot*, June 3: We do not set ourselves up to be a prophet, but unless

we miss our prediction very bad there will be greater activity in mining circles here before fall than ever before known. You would like to know in what particular locality the revival will be. According to our judgment we believe the belt of mineral about four miles west of Crested Butte, running in a northeasterly and southwesterly direction, beginning at what is known as the iron swamp, will be the locality. This will take in Redwell Basin and Evans Basin, where the old man Meagher is located. Recently claims have been located in the iron swamp by A. M. Donaldson and John J. McKay. There has been some ore shipped to the Tomitichi Valley Smelting Works, and while it does not run much in silver it is just the kind of iron ore they want for fluxing. We believe that shipments will continue. Farther up the hill from the iron swamp is the Keystone tunnel, worked by Mr. Williams for a Philadelphia company. Fred Krueger came in from Denver last Tuesday and will remain some time, with a view of working his property on Ruhy Hill. He is very anxious to get up there, for while prospecting around the Eureka ground last fall he discovered an entirely new vein which he considers a good thing.

IDAHO.

CLAYTON.—*Idaho Messenger*, June 1: Clayton is the only place in the mountains, north of the Salmon range, that has the look of coming life about it. Of course, all towns in this range are a bit quiet in winter; but as summer comes they usually revive. This year, however, the outlook is not cheerful in any place excepting here. The Smelter started to-day, and we may say everything opens favorably. Ore is coming from all directions, and strange as it may seem to all old residents, quite quantities, aside from Excelsior ore, come right from the town of Bayhorse. This does not argue well for the whole country. Ore should be reduced at the most convenient point to where there are reduction works. Carrying it even one extra mile for reduction is that much loss, but the loss is far greater when it comes to carrying it 15 or 20 miles away from its natural point. All this should and will, undoubtedly, in time, be remedied. Extra work is not like fire or flood, but, nevertheless, it is a loss, and is to be deplored in a country where labor is as expensive as here and capital as limited. The Clayton smelting company have a large amount of coal on hand, therefore there will be little burning at present. No more will be needed for two months, when a large quantity will be required for one stack, as immense amounts of ore are to be reduced. We think the different kinds of business will be prosperous here this season. One can see and feel the good time coming. We visited the Ella mine to-day. It is a large vein of iron and carries a small amount of silver—formerly a great deal more. No place to this mine now shows rich, but its ore is used by the company for a flux. There is a little silver in all. It was considered to be a very valuable property in the early days of this camp. Its walls are lime and as far as we examined it nearly vertical, running about north and south. The company have put three men on this mine of late. Men come in and are put to work in an hour; but laborers must remember that there is only one stack, and that, therefore, everybody cannot come here and get work. It is the only place where men have been given employment so far this season in all our range; but this will not be the rule, we trust, in a few weeks.

MONTANA.

WOODVILLE.—*Cor. Butte Miner*, June 3: Mr. Henry Nickels and brother, in company with seven other gentlemen, including three mining experts and your correspondent, on Sunday last visited the Major Budd mining district. We were met by the superintendent, Mr. Henry McClosky, M. G. Stephen, Farnum & Co., the lessees, and several of the 15 employees. The tunnel has been run in 925 feet. Only last week the teams were withdrawn from delivery of ore. A "horse" was struck on the vein which proved 85 feet in length. From the face, now six and a half feet in width, the party picked down an amount of ore which was taken to the assay office, dried and pulped. The assay resulted in a very large "button," which represented 486 ounces in silver and \$52 in gold. The dump of this mine shows over 150 tons of good ore. The ore at present being extracted is sacked in the face, and so carried out on the car. Contingent to these mines, and adjacent, are those owned by Col. H. H. Horst, namely: The Silver King, Bonanza, Argenta, Cleopatra, Hannibal, Sierra Madre and Crown Point. This group of mines has been bonded to a California company for \$250,000. In less than two weeks hoisting machinery will be on the ground, and sinking will be commenced on a new shaft. The district not only promises well, but looks well as far as the mines are concerned. The veins are of good width, and carry a sufficiency of ore to warrant the owners in working them. The Otranto mine has on it a 35-foot tunnel and 15-foot shaft. The owners are drifting on the vein 500 feet. Seven feet of ore is worked on in the tunnel. Spurs and angles are continually coming in. A picked sample, assayed a few days since, showed 1375 ounces in silver and a trace of gold, but the general run of ore will not go over \$30 to the ton.

GLOSTER.—*Cor. Helena Independent*, June 5: Happening to be in the camp of Gloster recently, I met John A. Stemple, the father of this district, or the first man who ever prospected for or found quartz in this section. He tells me he has struck it enormously rich in the Piegan lead, one of his finds, and the same vein as the famed Gloster. Mr. Stemple says he can make good wages with a hand mortar. Mr. J. Gould showed me some of the quartz, and he says it pans over \$1000 per ton and there is at least four feet of it. Dorrity and Treddell are running a prospect tunnel in the Gloster hill for the purpose of cutting the old Parole and Zulu lodes, which prospect well on the surface. Another rich body of gold quartz is reported to have been struck on the Penobscot and Snow Drift ground. The Cruse mountain lower tunnel is now in nearly 300 feet, and they should soon encounter the huge body of ore that shows up so plentifully on the surface workings. A day and night shift are crowding ahead the south Drum Lummon tunnel, which by fall should bring the heading into the south Drum Lummon or Nine Hour vein where it crosses their ground. By this time the Bald Butte ten stamps are waking the echoes. I am told the B. B. mines im-

NEW MEXICO.

KINGSTON.—*Socorro Bulletin*, June 5: As an evidence of the opportunities afforded in this camp to miners of moderate means, we cite the fact that Rentschler & Canfield secured a six months' lease on the Comstock mine. For half of that period they worked the property indefatigably, and on Saturday, the 8th, succeeded in striking the present ore body, which is the marvel and pride of the district. From that date until the 20th of May, when our representative visited Kingston, they had taken out on an average \$12,000 per day, of which one third goes to Barton and Rugg, leaving \$4000 apiece for the fortunate lessees. The mineral is shipped by Rentschler & Canfield to Socorro for treatment. Kingston affords lead as a galena, as a carbonate and as a sulphate; silver in the form of chloride, sulphide and in some instances in a metallic state; copper occurs as a blue and green carbonate, as well as argenticiferous gray copper. In some cases the amount of silver contained reaches \$2000 per ton. One of the great wants of the camp is a sufficiency of teams to haul the minerals to Lake valley, the terminus of the A. T. & S. F. branch, distant 30 miles. Shippers are paying from six to seven dollars per ton for transportation this distance. G. W. Holt has leased his Savage claim to Campbell & Murray, who are cross-cutting at present, and have in view a big bonanza when they reach the deposit. Judge Holt is also developing his Eclipse, General Jackson and Uncle Jack, all of which are yielding pay lead mineral, carrying silver. Among the shipping mines of this camp our representative secured the names of the following: Virginia, Comstock, Gallico, Lady Franklin, Gray Eagle, Superior, Temple, Black Colt, Keystone, Illinois, Caledonia, Brush-hap, Louisville, Iron King, Blackeyed Susan, Bullion and Dimmick. The principal features of this camp are the small amount of capital used in the development of the properties, the energy of the miners who, under the great disadvantages of Indian incursions and the want of capital, have succeeded in placing Kingston in the front rank of silver producers. The strike in the Comstock is the prevailing topic in the camp. On the 20th inst., a 15-foot breast of ore was exhibited, and since then it is said to have enlarged considerably. This property produces ore running all the way from \$50 to \$3000 per ton.

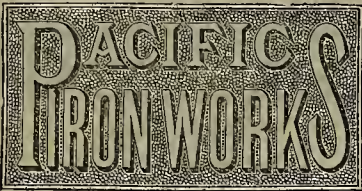
OREGON.

PINE CREEK.—*Cor. Redback Democrat*, June 2: From Mr. G. W. Dresslar, a mining expert from Salt Lake, who has been in the Pine creek district for the past three weeks, we learn the following: Tom Fitch and partner are down on their mine about 130 feet and have struck a very rich vein of silver. The superintendent of the Whitman would not allow anybody to go inside of the mine, so consequently nothing can be said of it. Mr. Dresslar says he likes the Sparta country very well, but when he arrived at Hogum he was delighted with the outlook there, and, as he is agent for a large company, he shipped some of the ore from this place to them, and he thinks after they have tested the rock they will make a purchase, and at once put in a 100-stamp mill that is now lying idle in Arizona. Mr. Dresslar returned to this city Friday, and before his return to Salt Lake he intends to visit the Pocahontas and Granite creek districts. He will remain in the city until he hears from Salt Lake in regard to the Hogum ore.

UTAH.

REVIEW.—*Salt Lake Tribune*, June 4: The receipts of bullion in this city, excluding all ore shipments or sales, for the five months of 1886, were \$2,162,206.89. The product of the Ontario for the same five months has been \$769,578.40, out of which \$375,000 has been paid in regular monthly dividends of \$75,000 each. For the month of May the Ontario product was \$1,678.17 ounces of fine bullion, and \$65,242.24 from ore sales; a total of \$146,920.41. The product of the Daly (mill running but three months, beginning near March 1st) for the five months has been \$228,837.52. For May the Daly produced 37,471.80 ounces of fine bullion and \$19,637.97 ore sales, a total of \$57,109.77. For the week ending June 2d, inclusive, the receipts of bullion in this city amounted to \$90,969.36; of ore, \$86,686.56, a total of \$177,655.92—again a very heavy week in ore receipts. For the previous week the receipts of bullion were \$45,700.62; of ore, \$69,265.44, a total of \$114,966.06. The ore is coming down from the hills rapidly, to rid the mines of the accumulations made during the time of impassable roads, and to supply the shortage of the smelters. The output of the Ontario for the week was 27,318.39 ounces in fine bars, and \$16,916.35 from ore sales. The Daly produced during the week eight fine bars, \$937,622; ore sales, \$16,393.20; total value, \$25,769.42. Base bullion received during the week was valued at \$14,200; silver bars \$14,840. The Hannauer smelter turned out during the week \$23,989 in bullion; the Germania, nine cars, \$20,875; the Pascoe, \$1530. Ore receipts were, by Wells, Fargo & Co., \$38,800; McCormick & Co., (including \$2660 Queen of the Hills) \$29,570; T. R. Jones & Co., \$19,519.39; Union National Bank (6¼ tons Bannock ore) \$2797.17.

SILVER REEF.—*Cor. Pioche Record*, June 5: Mining matters are rather quiet in the Reef at present. The Stormont and Christy Companies are making their regular shipments, and from all accounts they are still good-paying properties. There are rumors of the Christy Company changing hands, but they seem to be unfounded. The Silver Gate mine, owned by Messrs. Bales, Harding & Holling, has every indication of being a first-class paying property. The owners have already shipped about 50 tons of good ore to the leaching works, and have lots more in sight, having a four-foot vein averaging 68 ounces to the ton, and about six inches going 1000 to the ton. There are numerous chlorides not working on company grounds that are holding their ore until the rolls are in operation at the leaching works, where they expect to get better terms than at the company mills.



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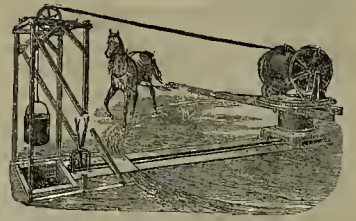
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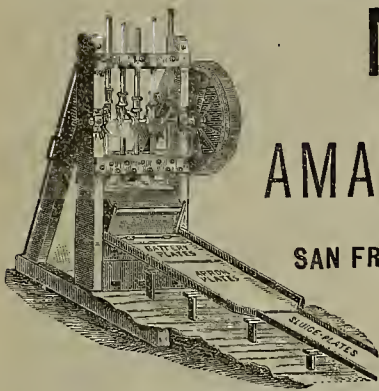
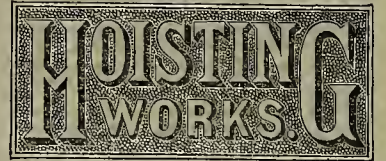
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SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.

The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case. Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

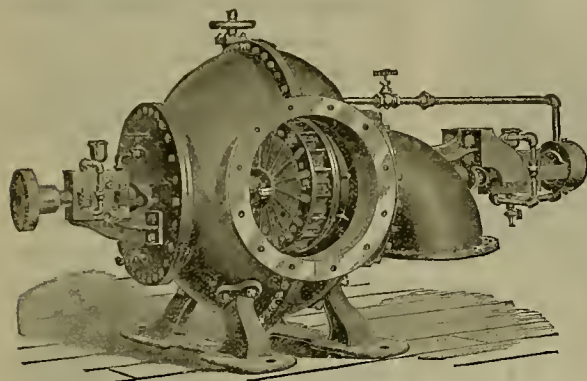
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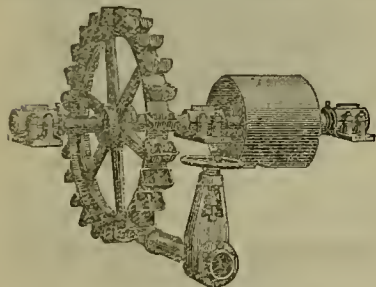
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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING JUNE 1, 1886.

- 342,586.—FIRE ESCAPE—D. P. Barrett, Oakland, Cal.
 342,115.—HORSESHOE—J. P. Dudley, San Jose, Cal.
 342,953.—WAGON JACK—W. T. Easterday, Watsonville, Cal.
 342,973.—WORKING COPPEROUS SILVER ORES—F. Ernst, S. F.
 342,795.—PRINTERS' CASE STAND, ETC.—N. C. Hawks, S. F.
 343,028.—LIFE RAFT—Chas. J. Hendry, S. F.
 342,799.—RAILWAY BRAKE—J. Kerrigan, S. F.
 342,918.—SAW-MILL TRANSFER TABLE—Geo. W. Loggie, Portland, Oregon.
 342,803.—LINK CABLE FOR STREET RAILROAD—S. R. Mathewson, Porterville, Cal.
 342,805.—HOP PRESS—A. Meyer, S. F.
 342,925.—BICYCLE SADDLE—John Payne, S. F.
 342,812.—WOOL-SCOURING MACHINE—C. P. Smith, Oakland, Cal.
 342,980.—STAMP FOR CEMENT PAVEMENTS—Chas. Sutton, S. F.
 343,089.—HOSE COUPLING—Symes & Buchtel, Salem, Oregon.
 342,852.—BUILDING COMPOUND—A. Walrath, Nevada City, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Mining Share Market.

There is nothing specially interesting to report concerning the stock market, the Comstock not having developed anything new. The bottom of the Combination shaft is now well into the east side of the ore channel, which dips east about 45 degrees, and is passing into quartz, which is found to be more and more strongly mineralized as depth is attained. Contrary to expectation, no increase of water is perceptible, and as none is met with in the drift south, coming to connect with it from the 3200 level of the Hale and Norcross deep winze, it may be that these mining explorations have reached below the main water belt. As soon as a sufficient depth has been attained for a pump or well to the shaft, below the 3200 level, a station will be opened for a drift north on that level, to connect with that from the deep winze aforesaid. Nothing new is developed as yet by the diamond drill explorations eastward from the Potosi 300 level. Good work is being done on the 2900 level of Norcross, 600 level of Savage and above the 600 level of Curry, with excellent ore indications in each, and with present pumping progress the bottom level of the Osbiston shaft will be found before the end of the present month. The usual large amount of low grade ore continues to come from the old workings of the bonanza sections of the north and south ends of the lode, keeping the mills steadily running and a large number of men employed.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Standard Con., June 2, \$7123; Mt. Diablo, May 26, \$10,168; Daly, 5, \$6019; Germania, 29, \$2410; Alice, 2, \$15,537; Silver Reef (for May), \$30,000; Hanauer, June 2, \$9440; Pascoe, 2, \$1530; Queen of the Hills, 2, \$1150; Alice, 5, \$13,750; Hanauer, 5, \$5600; Stormont, 5, \$2330; Crescent, 5, \$3600; Hanauer, 6, \$5580; Queen of the Hills, 6, \$3200; Germania, 6, \$4475. The shipments of ore and bullion out of Salt Lake City for the week ending June 6, inclusive, were 36 cars of bullion, 879,204 pounds; 17 cars of ore, 509,877 pounds; 10 cars of copper ore, 305,700 pounds; a total of 63 cars, 1,693,781 pounds.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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 J. J. BARTLETT—San Joaquin Co.
 G. W. INGALLS—Arizona.
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 Oso McDowell—Santa Clara and Santa Cruz Co's
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Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

It is expected that a big company will soon be organized to operate some of the best mines in Sweetwater district.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS. ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co.	Nevada.	29.	25.	May 28.	July 2.	B Burris.	329	Montgomery St
Belmont M Co.	Nevada.	40.	10.	Apr 30.	June 5.	J W Pew.	310	Pine St
Baker Divide M Co.	California.	11.	25.	May 3.	June 7.	D M Kent.	330	Pine St
Belle Isle M Co.	Nevada.	9.	10.	May 5.	June 8.	J W Pew.	310	Pine St
Bodie Tunnel & M Co.	California.	13.	25.	May 28.	July 8.	C C Harvey.	309	California St
Con Amador M Co.	California.	12.	25.	Apr 30.	May 30.	F B Latham.	327	Pine St
Crocker M Co.	Arizona.	3.	20.	May 25.	July 6.	A Waterman.	304	Montgomery St
Chollar M Co.	Nevada.	20.	50.	May 21.	June 24.	C E Elliott.	309	Montgomery St
Eureka Con M Co.	Nevada.	9.	1.00.	Apr 20.	May 31.	E H Willson.	328	Montgomery St
Golden Fleece G M Co.	California.	5.	20.00.	May 23.	July 13.	W J Glasen.		Phe an Block
Hale & Norcross M Co.	Nevada.	90.	50.	May 12.	June 14.	F F Lightner.	309	Montgomery St
Justice M Co.	Nevada.	44.	10.	May 12.	June 15.	R E Kelly.	419	California St
Live Oak Drift M Co.	California.	1.	10.	May 25.	June 30.	T Wetzel.	322	Montgomery St
Lucky Hill Con M Co.	Nevada.	3.	05.	Apr 5.	June 7.	F D Black.	27	Ellis St
Mayflower Gravel M Co.	California.	30.	25.	Apr 30.	June 6.	J Morizio.	328	Montgomery St
Mount Rose M Co.	Nevada.	4.	11.	May 13.	June 17.	J Oodington.	309	Montgomery St
North Peer M Co.	Arizona.	3.	02.	May 19.	June 24.	H Deas.	309	Montgomery St
Ophir S M Co.	Nevada.	51.	25.	June 7.	July 13.	B Holmes.	309	Montgomery St
Peerless M Co.	Arizona.	8.	50.	May 12.	June 22.	A Waterman.	309	Montgomery St
Peer M Co.	Arizona.	5.	10.	Apr 13.	May 20.	A Waterman.	309	Montgomery St
Palomas Placer M Co.	California.	1.	02.	June 1.	July 5.	D Buck.	309	Montgomery St
Sierra Nevada S M Co.	Nevada.	23.	10.	May 27.	July 1.	A Parker.	309	Montgomery St
Silver Hill M Co.	Nevada.	23.	10.	Apr 21.	May 27.	V P Dean.	309	Montgomery St
Union Con M Co.	Nevada.	33.	25.	Apr 19.	May 26.	J M Butington.	309	Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Almont M Co.	Nevada.	T Haman.	330 Pine St.	Annual.	June 26
Alpha Con M Co.	Nevada.	W Willis.	309 Montgomery St.	Annual.	June 21
Bodie Con M Co.	California.	G W Sessions.	309 Montgomery St.	Annual.	June 21
North Belle Isle M Co.	Nevada.	J W Pew.	310 Pine St.	Annual.	June 22

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
California M Co.	Nevada.	W I Oliver.	328 Montgomery St.	10.	Feb 23
Con Virginia & California M Co.	Nevada.	W Henson.	309 Montgomery St.	30.	Feb 12
Derbe Blue Gravel M Co.	California.	T Wetzel.	322 Montgomery St.	10.	Feb 9
Holmes M Co.	Nevada.	O E Elliott.	309 Montgomery St.	25.	Mar 20
Monro M Co.	California.	G W Sessions.	359 Montgomery St.	25.	Mar 10
Manhattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Feb 17
Silver King M Co.	Arizona.	J Nash.	328 Montgomery St.	25.	Mar 15
Young America M Co.	California.			40.	Apr 20

Sales at San Francisco Stock Exchange.

THURSDAY A. M., June 10.	400 Mexican.	33c
100 Alta.	300 Mono.	2.10
300 B. & Belcher.	350 Nevada.	.50c
250 Bodie Con.	250 Overman.	.20c
100 Bulwer.	100 Ophir.	.40c
200 Bullion.	100 Savage.	.35c
200 Chollar.	100 Union.	.50c
350 Con Va & Cal.	120 Utah.	.50c
150 Gould & Curry.	50 Union Con.	.40c
330 Hale & Nor.	100 Yellow Jacket.	.35c

New York Metal Market.

Telegraphic advices dated June 9th give the following New York prices:

BORAX— $\frac{6}{10}$ @7 $\frac{1}{2}$ c.
 BAR SILVER—98 $\frac{1}{2}$ % per oz.
 COPPER LAKE— $\frac{10}{10}$ @10.25.
 IRON—No. 1, $\frac{1}{2}$ @18.50; No. 2, $\frac{1}{2}$ @16.50.
 LEAD— $\frac{1}{2}$ @4.95.
 QUICKSILVER—43@43 $\frac{1}{2}$ c @ $\frac{1}{2}$ lb.
 The following is the latest from the "New York Metal Market Report":
 COPPER—Firm; Lake offered at 9.95@10.20c.
 Transferable Notices (Lake) offered at 10.15;
 Transferable Notices (Chili Bars) offered at 4.39 15;
 LEAD—Dull at 4.70@4.85c. Transferable Notices (Domestic) issued at 4.75.
 SPELTER—Dull at 4.40@4.75c. Transferable Notcs (Domestic) issued at 4.60c.
 TIN—Strong at 21.90@22.05c. Transferable Notices issued at 22.05c.
 TIN PLATE—Dull. Transferable Notices issued at 34 $\frac{3}{4}$ c.
 IRON CERTIFICATES—Quiet at $\frac{1}{2}$ @15 $\frac{1}{2}$ c.
 Transferable notices (May delivery) issued at $\frac{1}{2}$ @16 $\frac{1}{2}$ c.
 SILVER—New York, 99 per oz. London, 45 $\frac{1}{2}$ d.
 MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, $\frac{1}{2}$ @18.50; No. 2, $\frac{1}{2}$ @17.00@17.50; Grey Forge, $\frac{1}{2}$ @15.00@16.00.
 Southern, Grade No. 1, $\frac{1}{2}$ @18.00@18.50; No. 2, $\frac{1}{2}$ @17.00@17.50; Grey Forge $\frac{1}{2}$ @15.00.
 Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, June 9th, 22.00@22.15; Biliton Tin, 22.15@22.30; Banca Tin, 22.30@22.35; Baltimore Copper, 9.75@10.00; Orford Copper, 9.75@10.00; P. S. C. Copper, 9.75@10.15; Foreign Lead, $\frac{1}{2}$ @4.70@4.80; Foreign Spelter, 4.80@4.95.

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, June 10, 1886.

ANTIMONY—French Star.	9 $\frac{1}{2}$ @	8
BORAX—San Bernardino.	—	@ 8
Amagosa.	—	@ 8
IRON—Glengarnock ton.	22	50 @
Eglington, ton.	23	00 @21 50
American Soft, ton.	20	00 @24 00
Oregon Pig, ton.	21	00 @23 00
Clippier Gap, Nos 1 & 4.	22	00 @23 50
Steel—Lane White.	22	50 @
Slots, No. 1.	23	50 @
Black Diamond, ordinary sizes.	16	@ 25
Flow.	4	@ 5
Machinery.	5	@ 6
San Jose Bros.	10	@
COPPER—		
Braziers' sizes.	19	@
Fire-box sheets.	20	@
Bolt.	19	@
Shedding.	18	@
Ingot.	12	@ 13
LEAD—Pig.	4	75 @ 5 00
Bar.	42	@ 50
Pipe.	8	@
Sheet.	8	@
Shot, discount 10% on 500 bag.	1	85 @
Buck, $\frac{1}{2}$ bag.	2	05 @
Chilled, do.	2	25 @
ZINC—German.	9	@
Sheet, 7 $\frac{1}{2}$ ft, 7 to 10 lb. less tie end.	7	@ 10
QUICKSILVER—By the flask.	—	@24 00
Flasks, new.	1	05 @
Flasks, old.	85	@
TIN PLATE—Col.	5	30 @ 5 50
Charcoal.	6	15 @ 6 25

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.



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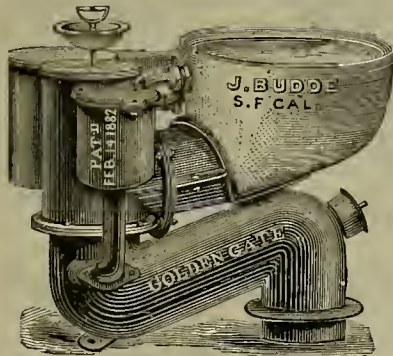


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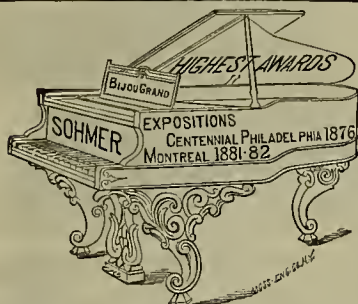
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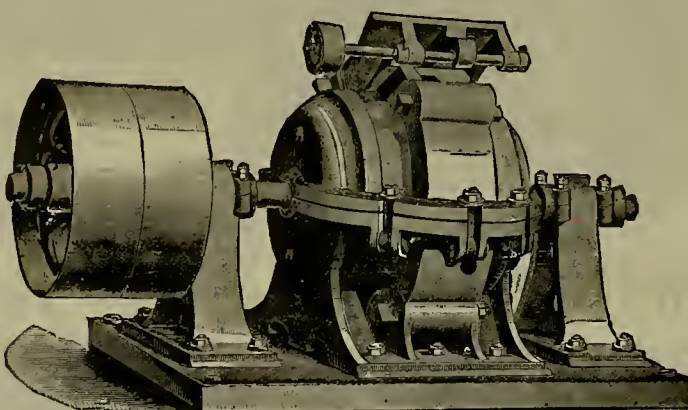
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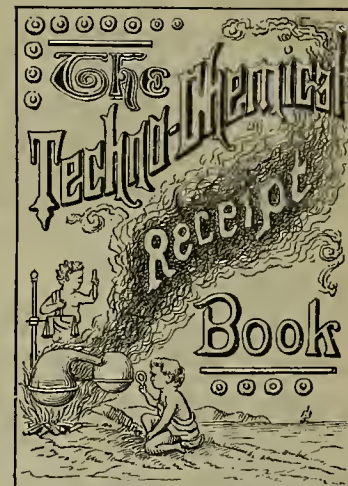
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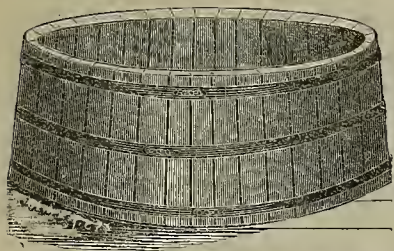
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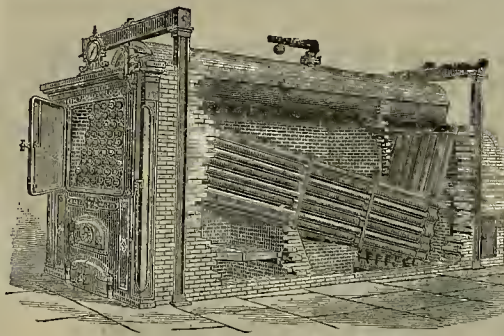
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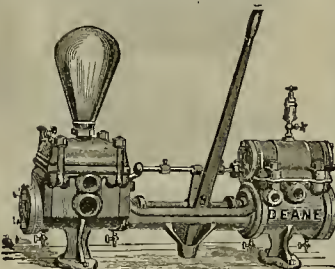
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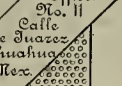
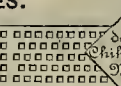
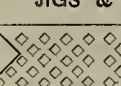
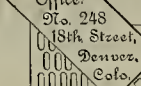
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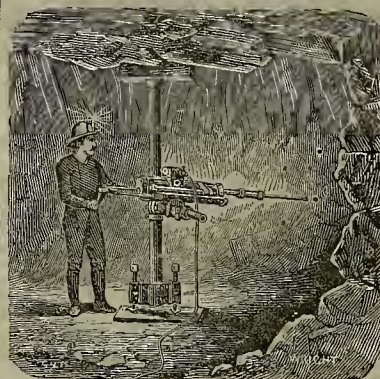
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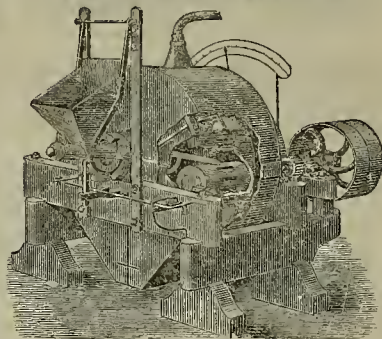
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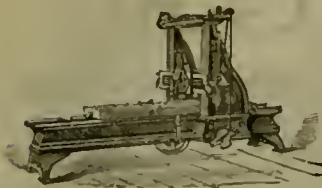
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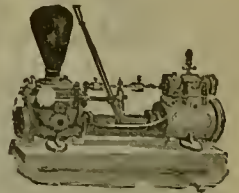
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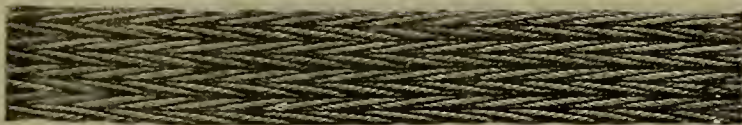
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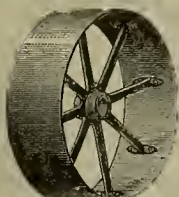
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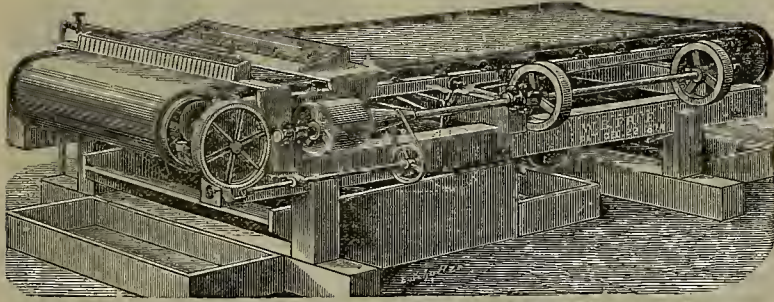
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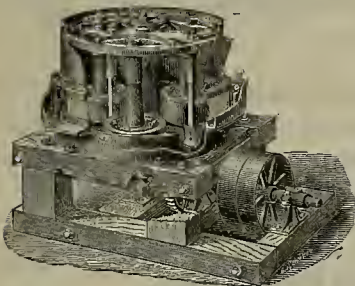
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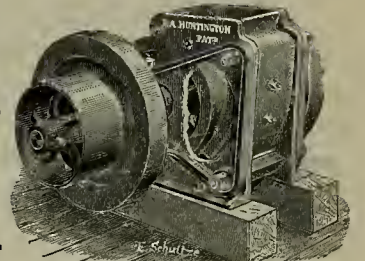
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JUNE 19, 1886.

VOLUME LII
Number 25.

Impure Amalgam.

Ores containing such compounds of silver as cannot be treated satisfactorily in pans, or concentrated tailings of the pan amalgamation which contain chiefly such silver ores as has resisted the action of chemicals, will give the best result after having been subjected to a chloridizing roasting. The presence of base metals would, of course, render the amalgam impure. A certain amount of copper in the bar is of no great moment. If there is a great deal of lead the metal must be refined. In amalgamation in pans, if the ore renders an impure amalgam, the impurity can be best ascertained after the first discharge by taking a sample of about 10 grains of amalgam which is heated to a red heat by fire under draft, to get rid of quicksilver. The sample thus retested must be examined under the blowpipe. The late Mr. Knstel has described the method in detail. Black amalgam is first tried with the magnet on a small particle. If attracted there is a great deal of iron in the amalgam. There may be a little if it does not follow the magnet, and it then must be examined in a way described by Mr. Knstel. A small piece is introduced into a closed tube and heated to redness by an alcohol lamp. It generally gives out a whitish sublimate consisting of minute globules of mercury which can be detected by the magnifying glass or by a piece of flattened gold, which, when introduced into the tubes and rolled over in the sublimate, gets a coating of quicksilver.

Heated in an open tube, it sometimes colors litmus paper red. This proves the presence of sulphurets in the amalgam. Under such circumstances, a black sublimate appears, consisting of sulphur and antimony.

A small particle of bullion, metal, or retorted amalgam, is laid in charcoal and heated with the oxidation flame. A slight yellow coating indicates lead; a bluish-white, antimony; or the coating is yellowish, and, further off, a bluish-white, proving the presence of both lead and antimony.

If there are no other metals in it but iron, there is no remedy save better roasting. The chlorides of other base metals can be destroyed by using quicklime, pulverized lime rock, or clean wood ashes. One or one and a half per cent of lime is charged with the ore. After a quarter of an hour's time, a small portion of the ore is taken from the pan, put into a porcelain cup, and, by means of a piece of copper, stirred with more water and a few drops of quicksilver. If the quicksilver is covered with a black coating instantly, some more lime must be added. Fifteen minutes later another sample is taken in the same way, and so on until the quicksilver does not appear black, or only slightly so. Too much lime is injurious to the character of silver. This method is only a temporary remedy. It can be better executed in the furnace.

A BREAK in the spur-wheel connected with the hoisting machinery made it necessary to shut down the Crown Point and Belcher mines pending repairs. The shutdown throws 200 men out of employment, besides the force engaged at the Vivian, Santiago and Mexican stamp mills on the Carson river. The break resulted from the machinery getting out of line by the settling of the ground in the vicinity of the shaft. It will require three weeks to get the hoisting machinery in running order.

Mill for Crushing Bullion for Refining.

In refining coppery bullion on the Comstock, the bullion in lumps from the retorts is thrown into a hot roasting furnace, after a regular day's work, and left until next morning. This is done for two reasons: primarily, to facilitate crushing, and, subordinately, to drive off any contained quicksilver. All bullion is crushed in a Chili mill, the castings of which were made from a rough sketch (similar to that shown in the engraving) given to the foundry. A. D. Hodges, Jr., describes this mill before the American Institute of Mining Engineers, as follows:

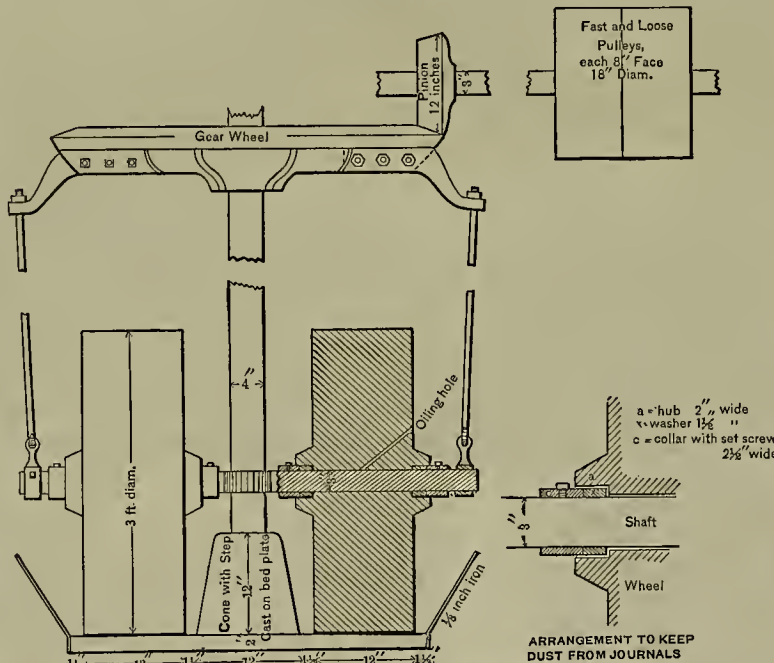
The pin is stationary, the wheels rolling around on it. The mill was run in a small room, the floor of which was covered with

gain of 97½ pounds (0.07 per cent), which probably represents the wear of the wheels and pan.

Foundry Notes.

The Risdon Iron Works are building the large engines and boilers for the new cable railroad in Oakland. The boilers used will be of the Hsine pattern. The engine-house is located at Twenty-first street and San Pablo avenue.

The Pacific Rolling Mill is putting in the turn-table for the Oakland cable road, at the corner of Seventh and Broadway. It will be slightly raised above the surface of the street, after the fashion of the turn-table at the foot of Market street, in this city, so as to afford a slight incline for starting the cars. The turn-



IRON CHILI MILL FOR CRUSHING BULLION.

sheet iron plates to prevent loss and insure cleanliness. It worked well and needed no repairs or special attention. One Chinaman did the crushing, sifting the pulverized material through a No. 20 wire screen. As the mill was run very irregularly at the Lyon mill, it is difficult to state its exact crushing capacity. According to the accounts the mill crushed about 100 pounds of sulphurized white and 200 pounds of calcined base bullion (including sifting) per hour. The cost of crushing, reduced to terms of retort material, was 0.175 cents per pound for white bullion and 0.088 cents per pound for base. The average would be (at one part white to four parts base) 0.105 cents per pound of retested bullion.

The base bullion crushed almost completely, the average percentage of the lumps left during two years being 0.55 per cent. The amount of lumps from crushing the sulphurized white bullion varied considerably according to the manner of firing the sulphurizing kettle, and also according to the percentage of melted bars (from the crude bullion assays, etc.) put in the kettle. The average for two years was 6.86 per cent.

The wear of the mill was very small. The returns from 138,634½ pounds charged to the mill were 138,732 pounds, showing an apparent

table is 24 feet in diameter with concrete foundation. The excavation is large enough to accommodate the tail-pulley.

The National Iron Works are building a new battery, called the Kendall Rocking Battery. The particular advantage claimed for this machine is that the roller wears down smooth and evenly in the cradle and thus has always a round face. The cradle, which is lined with iron plates, keyed in so that they are easily adjustable, vibrates in a ratchet frame, and the roller is guided by a simple contrivance. The machine when completed weighs 4500 pounds, and will do the work of a five-stamp mill. The roller weighs about 1100 pounds. A machine now at work at Altaville gives perfect satisfaction, and with ten miners' inches of water for power, crushes 12 tons of ore a day. The cost is only about \$400.

ERA, Idaho, is a new camp, the principal mine in which is the famous "Horn Silver" now owned and worked by the Bannock Mining Co. The company is now erecting a 20 stamp dry crushing mill, under the supervision of J. K. Owens. The town has nearly 100 buildings of all descriptions, and there are probably 500 inhabitants.

Dykes' Rock Crusher and Pulverizer.

Hugh J. Dykes, of Berkley, Alameda Co., has received, through the MINING AND SCIENTIFIC PRESS Patent Agency, a patent for a rock crusher of that class in which the rock is crushed and pulverized between a fixed and movable jaw.

In this device the fixed jaw is mounted on a vertical plane in one end of the frame, and is adapted to be removed therefrom and be set up or adjusted by the following construction: The ends of the jaw have tongues, which slide down within and are seated in grooves in the frame, said grooves being wider than the tongues. In angled seats in the rear of the frame are inserted wedges, which are cored out and form grooves in which the head of bolts are fitted. These bolts are provided with nuts on the outside, by which said bolts may be set up so as to hold the wedges against the back of the jaw or bed. By dropping or raising the wedges, the jaw may be adjusted closer to or drawn backward from the face of the movable jaw, and may be held in the position to which it is adjusted by setting up the bolts. By loosening said bolts the gibbs may be taken out and the jaw may be removed by raising it out of the grooves.

The movable jaw is pivoted on a shaft, which passes through the frame and is provided with pins by the removal of which the shaft may be taken out, so that the jaw may be thrown back out of the way, said jaw turning on its end point and resting when thrown back on a shaft in the frame behind. Pivoted on a cross shaft is a lever, the forward end of which is connected by a link with the rear of the jaw or head. The rear end of the lever is slotted and receives a strap which is pivoted to said lever. The strap is operated by an eccentric.

By means of the lever and link the inventor obtains a compound leverage, by which to vibrate the movable jaw. It is so arranged as to be operated by hand if desired.

The face of the movable jaw is provided with a shoe which has a dovetailed tenon, made transversely and horizontally upon its back and fitting within a correspondingly beveled groove in the front of the jaw or head. The shoe may thus be slipped out of the jaw for cleaning purposes or for reversing it, or for the substitution of another shoe.

Though fitted in by a dovetailed connection, the shoe is held firmly in place by the sides of the frame, and requires no other means to hold it on its seat. The corrugations on the faces of the two jaws are of peculiar arrangement. They are made only upon the ends of the faces, the centers being left smooth. The corrugated faces, therefore, serve for crushing the rock, while the smooth centers serve for the pulverizing. The corrugations on each side are uniform as to the space they cover, which provides for the reversal of either jaw. Another feature is that the corrugations on the face of one jaw are vertically arranged, while on the other they are arranged in horizontal levers. This gives a better grip and more effectively accomplishes the crushing.

A SCIENTIFIC expedition under the direction of Professor Scott leaves Princeton next Monday for the West, the main object of the expedition being to make a geological survey of the Uintah mountains in Western Utah and Wyoming.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

A Theory as to the Management of Mining Employes.

EDITORS PRESS:—I have long had the conviction that a prudent mining manager, who had been careful to select, say 20, highly-recommended miners, and was paying them extra wages, would do more and better mining work than could possibly be done by another manager who had to depend on 30 employes taken at random as they came along seeking employment.

Whether this theory is capable of being put into profitable practice is something I have not yet been able to prove except on a small scale, and one object I have in stating it here is to induce, if I can, some of the practical mining readers of the PRESS to give their opinions on the subject. That it is an important question cannot for a moment be doubted.

We are continually witnessing contests between employere and employes, as to wages, hours of labor and cognate matters; and as long as there is no bond of mutual respect, sympathy, interest, or friendliness between such parties there must be the strikes and losses which naturally follow them.

How to Put Theory Into Practice.

A mine-owner located in a district where miners' wages are \$3 per day may, as the first step in carrying out his plan, resolve to pay \$3.50, or even \$4, to the men he desires to employ. To secure the right kind of miners he may advertise, write to mining friends, or in person, or by agent, visit important mining centers. By careful inquiries, free conversation with applicants, and the aid of a sound knowledge of human nature as it is revealed in physiognomy, he will be able, after considerable toil and expense, to get his 20 employes together. He will have committed some mistakes and have been made the victim of perhaps one or two designing men, but he will be in a fair way to make a satisfactory start.

Every right-thinking man in such a crew will reason in this way: "I am to get extra wages without extra hours of labor; no attempt will be made to watch or drive me; as long as I attend zealously to my work I will be, as nearly as possible, my own master. Surely that is an improvement on the ordinary way of managing miners, and it ought to succeed. It will be to my interest, as well as to the interests of my 19 co-workers, that it should prove successful, and we ought to strive toward that end."

These views will be interchanged among the men, and there will be united, harmonious action to give them effect. Every miner will act with a determination to make the work, so far as he is concerned, go on satisfactorily. In the breaking down of ore, care will be taken to exclude waste, and at the close of each day the owner of the property, as the result of the skill and industrious zeal of his workmen, will have obtained, in thoroughly effective, creditable work, far more in value than the extra wages he had agreed to pay. He will, moreover, have a quiet, orderly class of people around him. There will be no intoxication, no profanity, no systematic gambling and no fighting or murderous plottings in such a camp. The families, too, of the right kind of miners will be on a higher moral plane than those of the mere here today-gone tomorrow tramp miners, with whom whiskey, pistols and cards seem to be the three primary desiderata of existence.

The thirst for knowledge displayed by the children of the high-class miners will spur the mine-owner on to provide reading-rooms, libraries and lectures, so that the next generation may compare favorably with the present. In a community under such auspices, churches, schools, colleges and education in its widest sense will have encouragement, and civilization will radiate from it as a center of progress and enlightenment. The man who thinks that a mine-owner who pays out daily a round sum of money as extra wages for extra mining ability in the way above indicated, is a simpleton who parts with it very easily and gets no adequate return, must have a strange idea of human nature, and know extremely little of the possibilities of doing or not doing effective mining work in the lower levels of a mine.

What Objectors Say in Relation to This Theory.

"Your plan will not work at all," says one person. "The men you employ will give you no more work than the ordinary \$3 men. Your being liberal will make them regard themselves as privileged favorites, who can do as they please, and extra work will be about the last thing they will give you for extra pay." Says another: "You will find plenty of mining superintendents willing to recommend miners as first-class workmen who are the commonest kind of hands. When you find you have been deceived and try to get rid of such men you will get yourself into trouble. They will assert their qualifications, and demand traveling expenses for being misled as to permanent employment."

Says a third: "The only true way to get a good crew of miners is to take every man that

comes along and prove what he can do. After a time you will have picked out as many good men as you want, and they will do just as much work as your high-priced miners. If they do not, a watchful foreman will weed them out and the rest will be scared into increased activity. You cannot get men in this country who will work from noble motives. They work for so much money and they will do just as little as they can to secure it."

I listen to these and similar mistaken opinions, but remain as thoroughly convinced as ever that my theory is capable of being put into profitable practice.

What has been Done in a Small Way.

I once paid a strong, skillful miner \$5 a day when \$4 was the current rate, to open a 60-foot tunnel in blasting limestone. When finished, the work, including materials, cost me just \$3.60 per foot. No miner would have taken it by contract at less than \$6 per foot.

I hired two able miners at \$4.50, when \$4 was the common rate, to do surface work. It was cold weather, and I was not particular as to hours if they gave me a fair day's work. These men could not have worked harder under contract, and I never got so much labor for a given sum of money as they gave me.

But a neighbor complained that my mode of treating my men made him trouble with his miners. A few days thereafter I went to my neighbor's tunnel and found one man on guard and five enjoying a comfortable sleep. They explained that they were kept at the mine from before daylight in the morning until it was quite dark at night, and they would not under such treatment do vigorous work.

Summing Up the Case.

I know there are some men who will invariably take advantage of an employer's liberality, but they are the exception and not the rule. There would be no room for that class in the carrying out of the theory I have set forth. The men to be employed must be capable of appreciating generous treatment. If they failed to display that capacity they would be got rid of at the earliest possible moment.

A mine managed on the plan indicated would have no need of a "driving" foreman. Every workman would know his work and do it without nagging or interference. A mine run on that principle would be easily managed. Its works would always be in good order, and caves and accidents would be reduced to a minimum. I may be wrong, of course, in holding such views, but all the same I should like to see them put into practice. CENDA.

Mounting the Lick Telescope.

The Lick Trustees have awarded the contract for mounting the 36-inch objective (now in the hands of the Messrs. Clarke of Cambridgeport) to the firm of Warner & Swasey, Cleveland, Ohio, for the sum of \$42,000. Messrs. Warner & Swasey were successful in a competition which included most of the celebrated makers of the world. One firm of celebrated makers (the Repsolds of Hamburg) declined to compete on account of the short time available for the purpose. The mounting proposed by Messrs. Warner & Swasey will include every one of the improvements which have been lately introduced into the mountings of large telescopes, with the addition of one or two improvements peculiar to themselves.

The telescope is to be 57 feet long; the diameter of the tube is 42 inches. The tube is suspended at the middle, and the point of suspension is to be 37 feet above the floor of the dome. The axes on which the tube moves are supported by a heavy iron column, 17x10 feet at its base.

Provisions are made by which it is possible for an observer at the eye end of the telescope to command all the possible motions, and these same motions can also be controlled by an observer stationed on a small balcony 20 feet above the floor. It is expected that, in spite of the great size of the telescope itself and of its great weight, the mechanism will be so delicately adjusted as to render the use of power unnecessary.

Messrs. Warner & Swasey are to have this mounting completed in April, 1887, and sometime during the summer of 1887 the glass will be brought to Mt. Hamilton, where the mounting will already have been erected under the great dome, now building at the Union Iron Works of this city, so that one may look forward to the completion of the Lick observatory sometime during the next year. It is impossible without an accurate description to give any complete notion of the excellence of the provisions which have been made by the Lick Trustees. A rough idea may be had by considering the cost of the various parts of the great telescope, dome, mounting, etc.: Cost of the dome, \$56,850; cost of the mounting, \$42,000; cost of the visual objective, \$53,000; additional cost of the photographic objective, \$13,000. Total, \$164,850. Beside these sums, several thousand dollars will be required to put the instrument into its final completed state.

At this season one often finds that a can of fruit has soured so as to taste badly, even after a thorough scalding. In such a case a little soda will sweeten perfectly. Skim carefully as it boils up.

Attorney-General Garland on Debris.

The following is an Associated Press dispatch dated Washington, June 10th: Attorney-General Garland, to-day, submitted to the Senate Committee on Commerce an opinion in regard to the intervention of the General Government for the protection of the navigation of the Sacramento and San Joaquin rivers from impairment by the continued discharge of hydraulic mining debris. He says: "The Constitution gives Congress power to regulate commerce, and as a subsidiary right, this regulating power is not confined to the subject of traffic, but extends to the channels through which traffic is carried on, and therefore embraces jurisdiction in Congress over the navigable waters of the country as to all things appertaining to them as highways of trade and intercourse, and especially as to whatever affects their navigation. Congress controls the building of bridges over navigable streams, establishes lighthouses, prescribes regulations to govern vessels and adopts measures for the improvement of navigation, even to the extent of changing the rivers. For such and like purposes these waters are the public property of the nation and subject to all requisite legislation by Congress. This power to regulate was conferred on Congress only, the States having abdicated all control over commerce, and a high and imperative duty was laid on the National Government to protect and encourage commerce. The effect of this as to navigable waters is to establish them as highways, open to the free and unrestricted use of all persons engaged in foreign or interstate commerce." The Attorney-General continues at length his argument to show the undoubted right of Congress to legislate in all matters appertaining to the interests of commerce. He says the papers submitted to him furnish convincing evidence that the navigation of the Sacramento and San Joaquin rivers and their tributaries has been seriously impaired and in some places destroyed, and is threatened with complete destruction by washings from the mines worked by the hydraulic process, the evil extending to the Suisun and San Pablo bays, and even to the great bay of San Francisco. The navy yard at Mare Island and other Government works must be seriously damaged if hydraulic mining, as now conducted, is allowed to continue. Although the rivers named lie wholly within the State of California, they communicate directly with and are navigable from the sea, and consequently, are highways of interstate and foreign commerce, and fall clearly within the jurisdiction of Congress. It cannot be doubted that the filling of the channels of these great highways of commerce is a public nuisance, stupendous in extent and injury, which loudly calls for the interference of a restraining power; but that that restraining power be exerted by the Government of the United States without additional legislation, there being no provision in the criminal legislation of Congress making it an offense to obstruct navigation. There is no remedy under the present law by indictment, as a thing cannot be an offense against the United States except it has been declared such by an act of Congress.

Another means of remedy is through the United States Courts by an information filed and a suit brought by the Attorney-General. The Supreme Court has recognized the fact that a court of equity may take jurisdiction in cases of public nuisances by that process. The subject of the proper form of remedy against nuisances affecting the United States came before Attorney-General Cushing in the matter of Wankegan breakwater, and the conclusion reached by him was that it was the undeniable law of the land that the Attorney-General has authority, when the occasion requires the abatement of a public nuisance to navigable waters, to file an information therefor, and a bill of injunction in the proper court of the United States.

The Attorney-General concludes: "I am not called upon to consider the effect of any action of the State of California authorizing the injurious use of the above-named rivers as receptacles of debris produced by hydraulic mining, supposing such action could have any possible validity in view of the express conditions on which the State was admitted into the Union, viz.: 'that all navigable waters within said State shall be common highways and forever free, as well to the inhabitants of said State as to the citizen of the United States, without any tax, duty or impost therefor.' No one pretends that the State has in express terms given any authority for the injurious use of those rivers, and the argument that such authority may be collected by implication from the legislation of the State, or the United States, or both together, has been completely met and overthrown by the learned Circuit Judge of the Ninth Circuit, in his opinion, in the important case of Woodruff vs. the North Bloomfield Gravel Mining Company, in which the facts, now before me, were held to constitute a public nuisance that might be properly enjoined on a bill filed by a private person specially aggrieved.

"Looking, then, at the question submitted, in the light of reason and authority, I cannot entertain a doubt that the evil complained of is leveled at a great national right, which is placed by the Constitution under the peculiar protection of the United States; that it is a case specially calling for the interposition of the restraining arm of equity, there being an entire

absence of the ordinary remedy at law by inheritance, and that it is the duty of the United States to take prompt action, either by an information in chancery or by legislation, making it penal to obstruct or impair the navigation of any waters under the jurisdiction of the United States. And in view of the urgency and importance of the subject, I take leave to recommend that it be brought to the attention of Congress at the present session."

A communication from Secretary Endicott calls attention to the suggestion of the Attorney-General, that prompt action be taken either by information in chancery or by legislation. The Secretary agrees with the Attorney-General that legislation is demanded, and recommends that these obstructions be made indictable offenses, with suitable penalties, and also that some provision be made for bringing hills in equity in the name of the United States, with stringent provisions for the enforcement of the courts' decrees.

Comstock Bullion.

The Virginia Chronicle says: An abstract statement of the bullion product of the mines in Storey county for the quarter ended March 31, 1886, has been filed at the Recorder's office by Assessor George Henning.

During that period 68,288½ tons of ore were extracted and crushed, the bullion product from which foots up \$816,464.96.

The total cost of mining, transportation and converting it into bullion is given at \$834,879.64. The product was divided as follows:

	Tons.	Val. per ton.	Total.
Con. Cal. & Va.....	30,093	\$11.60	\$349,370.80
Belcher.....	10,409	11.84	113,103.79
Crown Point.....	11,263	12.62	142,274.83
Yellow Jacket.....	11,789	12.66	149,303.09
Overman.....	1,740½	10.81	17,955.29
Kentuck.....	2,989½	13.20	39,457.66
Total.....	68,288½		\$816,464.96

Increase in the Bullion Yield.

The above shows an increase of 8000 tons over the output during the previous quarter ending December 31, 1885, and an increase in the bullion product over that period of nearly \$100,000. It is estimated that the bullion product for the current quarter will foot up \$1,000,000.

According to the above statement the cost of production of bullion from ore extracted from the Con. Cal. & Va. mine during the last quarter leaves a margin of only \$912 to be divided among shareholders.

In the Crown Point the figures show a balance of \$6000 in favor of shareholders, while in the Belcher and Yellow Jacket the cost of production over the gross yield is stated at \$6000 in the former and \$22,000 in the latter.

The deficit in the Yellow Jacket was made good by the declaration of a left-handed dividend during the last quarter.

The bullion yield from Kentuck and Overman ore also falls below the cost of production, showing a balance of \$7000 against the shareholders in the former and nearly \$1000 in the latter.

Turning back to the year 1876, the Assessor's books show that the yield from the Con. Cal. & Va. mine during the first quarter exceeded \$6,000,000, on which Storey county received \$227,000 in taxes.

The tax on the yield for the first quarter of the present year is less than \$2000.

The Manufacturers' Association.

The last meeting of directors of the Manufacturers' Association was fully attended and the occasion of an extended and interesting review of the purposes and progress of the association, of the results which have been and may be accomplished through its efforts, and a warm discussion upon the policy to be adopted to make its work vigorous and effective in the future.

The subject of more earnest effort to secure to our manufacturers and producers equal advantages upon Government work and supplies was renewed, and the secretary instructed to communicate with our Senators and Representatives in Congress, requesting their active cooperation in obtaining for the use and benefit of our producing and manufacturing interests early and explicit information of all work and articles required in the various branches of Government service, so that our people may be enabled to compete favorably as to time and conditions with Eastern manufacturers. Also that in issuing specifications for articles needed, instead of requiring those of special and exclusive name and manufacture, others of equal quality and price may be substituted and accepted.

It being desirable, in view of the common benefit to be derived, that there should be united interest and action on the part of all producing and manufacturing interests in this State, so that the largest and most concentrated influence may be exerted for the advancement of local industries, it is requested and earnestly urged upon all persons engaged in any productive or manufacturing enterprise, of whatever character or wherever located, in this State, to communicate with the secretary of the Manufacturers' Association of California, giving their name and address, description of articles made or produced, amount or gross value of annual output, and average number of persons employed, together with any suggestions they may volunteer relating to the general advantage.

Improved Beet Sugar Machinery.

The United States Department of Agriculture continues its fostering work for the home production of sugar. The latest contribution to this end is a special report just prepared by Prof. H. W. Wiley, chemist of the Department, who was sent to Europe last summer to inspect the latest improved machinery and processes in this great European beet sugar industry. The results of his investigations are given in an elaborate illustrated report which we have no doubt can be obtained by those interested in sugar production on application to the Commissioner of Agriculture, or to any of California's senators or representatives at Washington. We have thought that we could best call the attention of our readers to this report by reproducing from a large plate a reduced view of a very ingenious arrangement for elevating, cutting and conveying the chipped beets to the cells of the diffusion battery.

This report shows that the best establishment, the sugar factory at Abbeville, in France, is arranged so that the central factory receives the juice from several "raperies," or stations where the juice is extracted from the beets, and the juice is carried by pipe lines laid underground from these raperies to the central factory, where the juice is freed from its impurities and condensed in the vacuum boiler into sugar. This method, of course, obviates hauling the beets long distances, as each station works up those grown in its district, and shoots the juices through the pipes, by a force pump, to the central factory. The plan seems to be much like the central cheese factory or creamery, which works up the milk or cream brought from all the farms within a radius of several miles.

The engraving gives a view of the interior of one of the raperies, and it is certainly arranged to do the work with a minimum of labor. The beets are shown entering this factory at the left and rear of the apartment, thence passing up the inclined elevator until they are dropped into the carrier, which in turn drops them into the open mouth of the cutter, which is seen aloft with the operator beside it. This cutter is directly over the center of the circle, around the circumference of which are seen the diffusion cells and to each one of which the spout or the chute from the cutter swings. In all the improved European factories the cutters are placed above the cells. It is more convenient to elevate the beets by suitable apparatus; it would be to carry the chips to the proper altitude. In all circular batteries the cutter is placed immediately over the center of the battery. The chips fall into the upper expansion of a pivoted chute which is placed at an angle of about 40 degrees. With this inclination the chips fall readily down the chute and into the opening of the cell.

The bottom of the chute is furnished with a hinged nozzle which, on being raised, arrests the discharge of the chips until the chute is pushed to the next cell, a procedure which takes only a moment of time. Thus the filling of each cell is entirely automatic, and the arrangement is the most simple as well as the most effective possible. Usually the cutter has a capacity greater than the battery, so that often its operation is stopped while the feed channel is changed from one cell to the next. It can be done, however, very well with the cutter in motion.

In the second place, the circular disposition allows the exhausted chips to fall into a common pit, whence they are easily removed by

an elevator to the presses. This pit, circular in form, is furnished with a bottom sloping toward the center, over which the chips readily move when discharged from the cells. Very little manual labor is therefore required to convey them to the elevator.

Lastly, the circular disposition permits the apparatus to be put up in a much more compact form, and thus diminishes the cost of the building and other necessary fixtures. There are many minor points of advantage, and in the erection of new plants at the present time this disposition of the cells in a circle is almost always preferred. The general view of the circular disposition, showing the method of charging and giving a notion of the arrangement of the

A LARGE ORE BODY.—The ore body encountered some four weeks ago in levels Nos. 1 and 2 of the Engine shaft, in the Paradise valley, continues to increase in size and richness. The Engine shaft is in No. 4 tunnel, about 200 feet from the surface, and levels 1 and 2 in that shaft are respectively 50 and 100 feet below the tunnel. In No. 2 level the ore body was opened on Thursday last 115 feet along its course, and the lead averages nine feet in width and the ore between \$150 and \$200 per ton. As no one has yet been enabled to see into the solid earth, though "diviners" or "dousers" claim to have the gift, it is impossible to tell the extent of the ore body, but the value of the ore in sight is estimated at over \$500,000. This

Lake Valley Concentrates.

The Sierra Grands mill fired up on the 20th of last month, and was working satisfactorily when our representative was there a short time since. Among the notable improvements inaugurated by Walter C. Hadley, who is now in charge of the company's mill and mines, we were struck by his plan for securing an economical supply of water. This was effected at an expense of less than \$125, by making use of the water supply in the 400-foot shaft west of the plant, higher up the bill. The column

of water rises 200 feet in this shaft, and Mr. Hadley placed two steam pumps in it, and the plant is now furnished with its entire water supply from this source, thus reducing the running expenses about \$500 per month, providing that the water supply in the shaft is permanent, which is very generally conceded. Formerly the water supply was forced to the mill from a distance of four miles by means of a pumping outfit stationed there.

Up to the first of last month, the management had failed to economically chloridize the flue dust; but now, owing to the auxiliary fires, enlarged dust chambers, the reduction of the draft by means of dampers and a novel contrivance to facilitate the roasters, carrying more load and retaining it longer, the flue dust, which is always a source of loss to reduction works, is satisfactorily treated and disposed of. The plant is in fair condition, and when our representative was there it was running smoothly and more economically than at any previous period in the history of the enterprise. Eighty men in all were on the pay-roll.

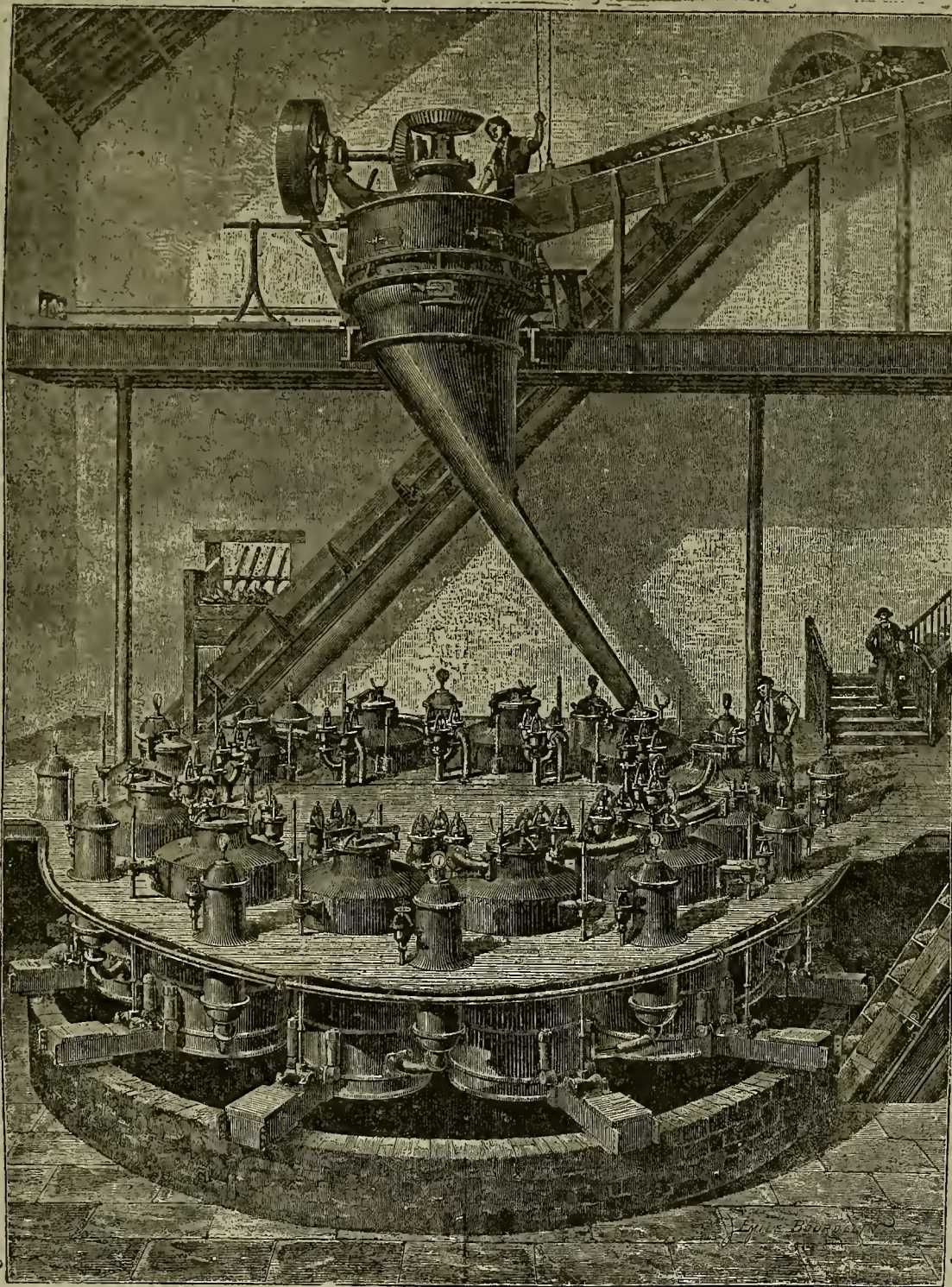
A 100-foot contract is now being completed in a new shaft not far from the Bridal Chamber to open up new ore bodies. Two hundred and fifty men will be required to keep the mill supplied with ore; but owing to the prospect that the management will soon enlarge the plant, and otherwise improve it, which will necessarily cause a suspension of operations for a while, we would not advise miners to go to Lake Valley with the idea of securing work.—*Socorro Bulletin.*

THE FORTUNES OF MINING.—An item is going the rounds stating that a telegram ordering the permanent shutting down of the Granite Mountain mine, in Montana, was delayed through the carelessness of a telegraph employee and did not reach the superintendent until two days after the date upon which it was transmitted over the wires. During that interval an important ore development was made and the mine is now paying handsome dividends.

Work would inevitably have been abandoned had it not been for the neglect of the careless attache of the telegraph office. The management of the mine have recently made the attache a handsome present of \$5000 in coin. This is probably the first instance on record of an employee receiving a liberal reward for neglecting his duty. The Granite Mountain mine is located near Phillipsburg, the county seat of Deer Lodge.

PASTEUR'S GREAT DISCOVERY.—The *Tribune's* London cable special says: The English Scientific Commission appointed to inquire into Pasteur's process has completed an elaborate investigation and is preparing a report which will affirm the efficacy of his method as a cure for hydrophobia and will rank it among the chief scientific discoveries of the century.

THERE are over 200 artesian wells in Kern and Tulare counties, all with a good flow of water.



INTERIOR OF FRENCH SUGAR STATION FOR CUTTING AND EXTRACTING JUICE FROM BEETS.

necessary apparatus, is given in the engraving.

We hope to see ere long beet sugar factories on this coast as well equipped as those of France. The report of Prof. Wiley shows how fine is their machinery and how successful its operation. With a country so well fitted for beet growing and sugar making as California it would seem but the part of wisdom for our capitalists, who have so much idle money, to put part of it in such enterprises to secure a good interest for their money, and at the same time distribute good returns among the beet growers and furnish cheap sugar for our fruit canners. The Alvarado factory has done well with limited capital and facilities. It should induce our rich men to go into the production on a grander scale, and thus minister to our general prosperity and progress.

The famous Black Bear mine, in Siskiyou county, worked by Lieutenant-Governor Daggett, is again paying. The *Yreka Union* says the prospects of a fortune are good.

ore has been developed at the greatest depth ever reached in this county, where, notwithstanding mining has been carried on for years, there is not a shaft, with this exception, over 300 feet deep. The Paradise bids fair to be the best mine in the State, and at the present time it is certainly the richest.—*Winnemucca State.*

MICA.—In Groton, New Hampshire, they are working a mica mine profitably. The ledge is really a large hill of solid rock, composed in the regular order after the covering of schist is removed—quartz, mica, feldspar, again and again, down through the hill to an uncertain depth. The work of blasting has been carried forward there until an open drift has been cut 300 feet long, at least 40 feet wide and not much less than 50 feet deep. Branching off from this cut is a tunnel now about 20 feet long and 20 high, drilled horizontally into the ledge. Small iron tramways lead to the dump, and little cars, pushed by hand, carry the refuse rock out of the way.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, June 19, 1886.

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Passing Events.

Some new mines have been discovered in the extreme southern part of this State, about 40 miles south of the Needles, but so far little is known of them.

The opinion of Attorney-General Garland on hydraulic mining, which we give on another page, is looked upon with great disfavor by those mining gravel in California.

A new gold "excitement" has broken out at the Kimberly fields, in Western Australia, in a region which local papers predict will be the largest gold field in Australia. With new gold fields in Australia, Patagonia and South Africa, those who like to visit distant regions will have several choices of location.

Two streams in the mountains are now all running full from the melting of the snows, and the mills which are run by water power now have an abundance.

PROSPECTORS from Metal Landing, 40 miles south of the Needles, on the Colorado river, report rich discoveries of gold. Men are leaving the Needles for the new camp.

Gold in Sulphurets.

The usual association of gold in quartz veins with sulphurets is well known. In gold regions the sulphide of iron (iron pyrites) is generally gold-bearing, as is also the arsenide of iron (arsenical pyrites or mispickel). The gold in these sulphides and arsenides is probably diffused mechanically and not in chemical combination, as some have claimed. Prof. Wm. P. Blake states that the experience of many years in the examination of gold veins and gold ores sustains the conclusion that the gold is mechanically diffused. Although the metal is generally invisible in the undecomposed and brilliant crystals of pyrites, it becomes apparent when such crystals are decomposed by oxidation air or by artificial means. Decomposition by nitric acid is frequently resorted to as a test of pyrites for gold. As a result of such decomposition we frequently find particles of gold, ragged in form, but of comparatively large size. So, also, when pyrite is changed to limonite by oxidation, and without losing its form, gold which probably was before the change scarcely visible, becomes distinctly visible in contrast with the brownish red color of the iron oxide. Deflagration of pyrites with nitrates of soda (Holland's process), which is simply another method of oxidation of pyrites, also liberates gold from arseniferous pyrites, and permits it to be seen when the oxide of iron is washed away. Roasting produces the same result.

In amalgamating gold ores it is common to find that fragments of either raw or roasted pyrites, but more especially the roasted, adhere to the quicksilver by a single point only, where the gold comes to the surface and finds contact with the quicksilver. Crushing and providing the pyrites also liberates the gold, but has the disadvantage of breaking up the ragged gold at the same time, and the color of the pyrites is often so nearly like the gold that it is difficult to distinguish one from the other. The State Mineralogist of California in his report of 1884 describes large crystals of pyrites from an El Dorado county mine, on the surface of which large globular masses of gold appear.

The opinion that gold is mechanically and not chemically disseminated in pyrites is defended by Adolph Ott, Henry Wentz and others. Ott, in the journal of the Franklin Institute, gives several good reasons in support of his opinion, and cites Bergmann, who, as early as 1735, showed by digestion in nitric acid, gold to exist in pyrites in small annular grains, thus proving the metal to exist in the state of rough limonite, and not of composition in the pyrites. Joseph Black, in his lectures on chemistry, appears to have held the same opinion.

It is the opinion of Prof. Blake that the gold in pyrites is generally in a crystalline condition, not compactly aggregated, but spread in a network in parallelism with the crystalline planes of the pyrites, forming a rude crystalline skeleton or crystalline fragments. The late Prof. John Torrey, of the U. S. Assay Office, showed that after treatment of pyrites with nitric acid gold appears under the microscope in laminae in filiform and spongy particles. An interesting example of spongy gold, occurring in a mine at Angel's Camp, in this State, was brought to the notice of Prof. Blake by the late Dr. Hill. It has the appearance of precipitated gold and the form apparently of a crystal of iron pyrites, looking as if it had been aggregated in a cavity left by decomposing pyrite. It is very light and is easily impressed and burnished by the nail. It is a good example of spongy, crystalline gold of natural origin.

A BIG OIL WELL.—They have put a cap on the new oil well at the Paente ranch, Los Angeles county, and are now talking of building a pipe line to the city of Los Angeles. The well is 20 miles east of that place. It has only been recently bored and was producing 50 barrels a day until one day last week, when the borers, in sinking the well to a lower depth, struck a new stream of immense strength, which threw the apparatus out of the hole with great violence, hurling a man 60 feet in the air, who barely escaped with his life, catching on the top of the derrick, thereby saving a heavy fall. The well threw out 500 or 600 barrels of oil in a few minutes, and flowed all over the place. The flow subsided soon, but may be renewed. It is hoped the well will now produce steadily some 150 barrels a day.

New Gold Fields.

The Kimberly fields, in Western Australia, are beginning to send nuggets in to Sydney. Some of these run from half an ounce up to 190 ounces. The gold is only slightly water-worn, so it cannot have traveled far from the quartz where it originated. A rush has already set in from Western Australia and from New South Wales. Large numbers of diggers, storekeepers and others have found passage round westward, while others from Victoria, New Zealand, etc., have arrived in Sydney, whence steamers are being specially laid on, most of which will call at the Queensland ports en route to pick up additional miners. The two places of debarkation are Port Derby (King's sound) and Cambridge gulf.

It is stated by some parties that this will be the largest gold field in Australia. The laboring whites men ask 15 shillings a day for work, and black or Chinese labor is scarce. It has been estimated by Mr. Hardman, the Government Geologist of Western Australia, that an auriferous area of country, extending over some 3500 or 4000 miles, exists. The latest information is a telegram from Perth, which states that a miner named Morgan has returned to Port Derby with a large quantity of gold, including a nugget weighing two and a half pounds of solid gold.

The newly-discovered Patagonia gold field extends from Cape Virgin, on the northern shore of the Strait of Magellan, along the Atlantic shore some 50 miles. The gold country is easily accessible, and the deposits are known to be rich.

There is a gold field also in the Transvaal, South Africa. In the closing week of last year 2560 ounces of gold were received at Natal. Farther north, rich deposits of gold and baser metals have been found south of the Zambezi. This region is but little known to white men, but if it is as rich as represented, tens of thousands of white miners will soon be in Central Africa. Northern Thibet is another region which is known to contain vast quantities of gold, which will very soon be extensively worked. It is an upland region, with underlying rock, and there is from 16 to 20 feet of soil, all of which is auriferous. Then there is gold in abundance in Manthuria. This is a region in China, near the Russian possessions. From Madagascar reports come of wonderful gold finds.

As all these places are at great distances from us, it is difficult to get any very definite information concerning them. The further gold fields are away, the richer they appear to be to those who read of them. To none of these places mentioned has a poor man any business to go, with only money enough to pay passage to the fields. The stranger is at great disadvantage in every way. It is bad enough to land "broke" in a camp in our own country, but the regions referred to would be had places to strike with empty pockets. Moreover, so little is so far known of these that only the most adventurous would start without plenty of money.

MINING CLAIM DEVELOPERS.—Says an exchange: It takes three classes of men to develop a mining camp. First, the prospector who finds the ledge, but rarely does anything more than assessment work, and usually avoids that if he can; next the small mining capitalist, who "bonds" the mine or takes a share of it for development work, and expends two or three thousand dollars on a chance of making several hundred thousand dollars; lastly, the San Francisco, or Denver, or Chicago, or New York, or London operator, who will pay a million dollars for a property which can be made to pay dividends on that sum, but who will not even send his experts to look at an undeveloped property.

MINERAL LAKES.—A member of the Geological Survey says that Salt Lake will be of great value in the near future, not only on account of the common salt it will produce, but also for the sodium sulphate it contains. The latter is separated in a flocculent precipitate by the cold weather of midwinter and annually thrown on the shore in enormous quantities. There are many other lakes in the far West where an inexhaustible supply of commercial alkalies may be obtained at small cost. Mono lake, Cal., alone being estimated to hold over 78,000,000 tons of sodium carbonate.

Gold and Silver Bullion and Coinage.

It is worthy of note that the receipts of gold and silver bullion in this city have shown for some few years a gradual but steady increase. This is a certain indication that mining operations are generally being conducted successfully on this coast, and that our field is widening. Not only are new mines being opened, but old ones are being reworked in all directions. In this State the quartz mining interest was never in a more flourishing condition, and the increase of product from this source has about made up the deficit caused by the enforced cessation of hydraulic mining. Mines that 10 or 15 years ago could not be made to pay, under present industrial conditions are profitable. We have learned more about quartz mining than formerly, and many of our old extravagant habits and customs have been abandoned, and more economical methods adopted. The result of these changes is best shown in the increase of bullion receipts.

It is satisfactory to know also that the search for good quartz mines goes unceasingly on. All over the coast, every summer, the prospectors are at work in the mountains and hills. While there is less mining speculation than ever before, there is now legitimate investment in mining properties. People are buying mines to work them rather than to "stock" them. This working of mines instead of markets is having its legitimate result in the increased output of bullion.

It is somewhat curious that the mint in San Francisco has been for some time running mainly on \$5 and \$10 pieces, and, as we understand it, no \$20 pieces are being made. This is of course done under orders from Washington, but it results in great inconvenience to bankers and business men here. In receiving returns for bullion deposited, they are paid by the mint of officials in \$5 and \$10 pieces. In order to get the \$20 pieces it is necessary to go to the sub-treasury with the \$5 and \$10 pieces, and get them exchanged for "twenties." So great is this demand for the larger pieces that oftentimes those desiring them must wait at the sub-treasury until after banking hours to be waited on. How long this state of things will last is not known, but the sub-treasury is being filled up with \$5 and \$10 pieces, and being depleted of the double eagles very rapidly. It adds greatly to the duties of the officials of the sub-treasury, and is a great nuisance to the banks and business men.

In this connection as substantiating our assertions, we append a circular just issued by the Selby Smelting and Lead Company of this city.

OFFICE OF SELBY SMELTING AND LEAD COMPANY,
416 MONTGOMERY STREET,
SAN FRANCISCO, JUNE 15, 1886.

The U. S. Mint is now closed to the public for its annual cleanup, and as the impression has gained upon the minds of the people that the product of the precious metals on this coast has been decreasing, it is thought well to call attention to the fact that this is not the case, as proved by statistics published in the Bulletin of June 3, 1886, being extracts from Mint records of the gold coinage of the San Francisco Mint for the first eleven months of the last two fiscal years, which compare as follows:

	1884-85.	1885-86.
Double eagles.....	\$17,100,000	\$6,000,000
Eagles.....	790,000	6,350,000
Half eagles.....	1,027,500	12,990,000
Totals.....	\$18,917,500	\$25,340,000

For the corresponding period in 1883-84 the coinage was \$16,913,500, thus showing gradual increase each year.

This company has the only large gold and silver refinery on this coast outside of the U. S. Mint, and it may not be uninteresting to show from its records the extent of its gold business during the 12 months ending 31st May, 1886. There was deposited by us in the Mint in fine gold for coin as follows:

	1885.	1886.
June.....	\$ 922,400.12	January.....\$1,227,943.33
July.....	2,556,478.08	February.....1,021,839.73
August.....	1,199,822.62	March.....1,073,459.94
September.....	912,733.07	April.....1,178,272.82
October.....	1,187,960.94	May.....1,222,159.24
November.....	894,162.82	
December.....	1,320,476.79	
Total.....		\$14,813,862.50

From which it will appear that over one-half of the gold for coinage is supplied to the public through this establishment.

Our new refinery and smelting works at Vallejo Junction are now in full operation, and everything works to our entire satisfaction.

We have also made other important changes in our business which secure to us increased facilities, and by which we are enabled to serve the public more acceptably than heretofore.

Our charges are the same as the Mint.

We make returns in coin for gold deposits in 24 hours. We keep duplicate assay samples for six months, that parties may check our work at any time.

The extent of our business testifies the confidence which the public have in our work. Our records show correspondingly increased business in silver, base bullion and ores, the products of newly-discovered mines, and also of old mines being opened up at different points throughout the entire coast, all of which tends to the irrefragable conclusion which is shared by all who carefully study the statistics and developments being made, that the business of systematically working our mines has only just commenced, and that the future is full of promise. SELBY SMELTING AND LEAD CO.

Working Gold-Bearing Sulphurets.

Concentration and Chlorination in Nevada County, Cal.—No. 6.

(Written for the PRESS by C. A. SCHENK.)

The Chlorine Generators.

There are four chlorine generators, which are made of lead and are cylindrical in shape, 22 inches diameter and eight inches deep. They stand in a sheet iron pan, containing water, which pan again rests on brickwork, forming a flue and having a fire-place at one end; a stove-pipe at the opposite end leads off the smoke. By this means the generators can be heated to the temperature of boiling water, in case the evolution of the chlorine becomes too slow. The generating vats are provided with lead covers, having two openings, each six inches in diameter, into which lead pipes are luted with flour dough. One of these pipes serves for conducting off the gas, the other for introducing sulphuric acid. The second pipe is so bent as to form a trap just above the cover to prevent the escape of gas.

By means of a two-inch lead pipe, which in its lowest part is level with the bottom, the generator is cleaned and prepared for a new charge. For this purpose water is introduced by means of a hose, after taking off the cover, and the contents washed out into a trough. In taking off the cover the escaping gas becomes very offensive. To avoid this, generators of a more recent construction are provided with another two-inch hole in the cover, which is closed during the process of making gas and into which the rubber hose is inserted and water introduced, for the purpose of washing out the spent contents. The generators in use are not provided with stirrers.

Each Generator Is Charged

With nine pounds of black oxide of manganese and 11 pounds of common salt. The cover is then luted on with flour dough, and the sulphuric acid is run in; 16 quarts of commercial sulphuric acid, 66° B., are diluted with three quarts of water, and one-half of this solution is used for each generator. The acid is charged into a convenient lead vessel above the generator, and by means of a faucet is allowed to pass slowly through the trapped lead pipe into the same. Toward the end the evolution of the gas is assisted by fire. In this way the chlorine is slowly evolved at about the same rate that it can be absorbed by the ore in the tub. The gas does not enter the vat directly, but is first passed through a washbottle for the double purpose of holding back the small quantity of muriatic acid carried along with the chlorine, and of indicating by the more or less lively bubbling the right degree of absorption and evolution of gas. From the washbottle the chlorine passes through a rubber hose which at the other end is attached to the lead nipple under false bottom in the vat. The generator can be started as soon as the vat is half filled

with ore, as the filling will be completed before the gas can reach the top. As soon as the chlorine has risen to within a few inches of the surface, the cover is let down into its groove and luted. The space between cover and surface of ore must be well filled with gas to be sure of good chloridization. The gradual rise of the gas and any leaks in the apparatus where it might escape are easily detected by the aid of

another 24 hours before water is introduced. For this purpose the cover is raised at the Providence, and through a rubber hose with a floating board attached to its end the water led over the surface. The expelled chlorine escapes into the room. At the Merryfield chlorination works, in the same district, the cover is not raised for the introduction of the cold water. The cover in these latter works is provided with three holes; through one the water is introduced by means of a rubber hose; through the other, to which is also attached a rubber hose, the expelled gas is led out of the room; and by means of the third opening the

tated in these by a solution of sulphate of iron.

THE Virginia Chronicle says: The gravel deposit at the head of Little Valley, eight miles southwest of Franktown, is being thoroughly prospected by placer miners. After a heavy rain last winter two nuggets of coarse gold

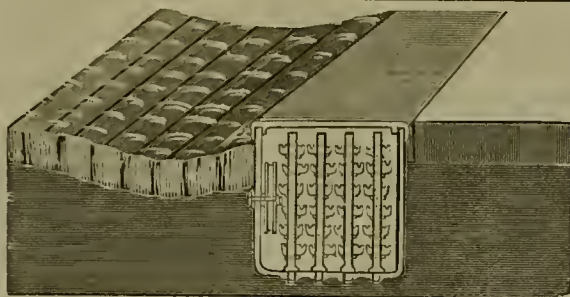


FIG. 2. CROSS-SECTION OF CONDUIT.

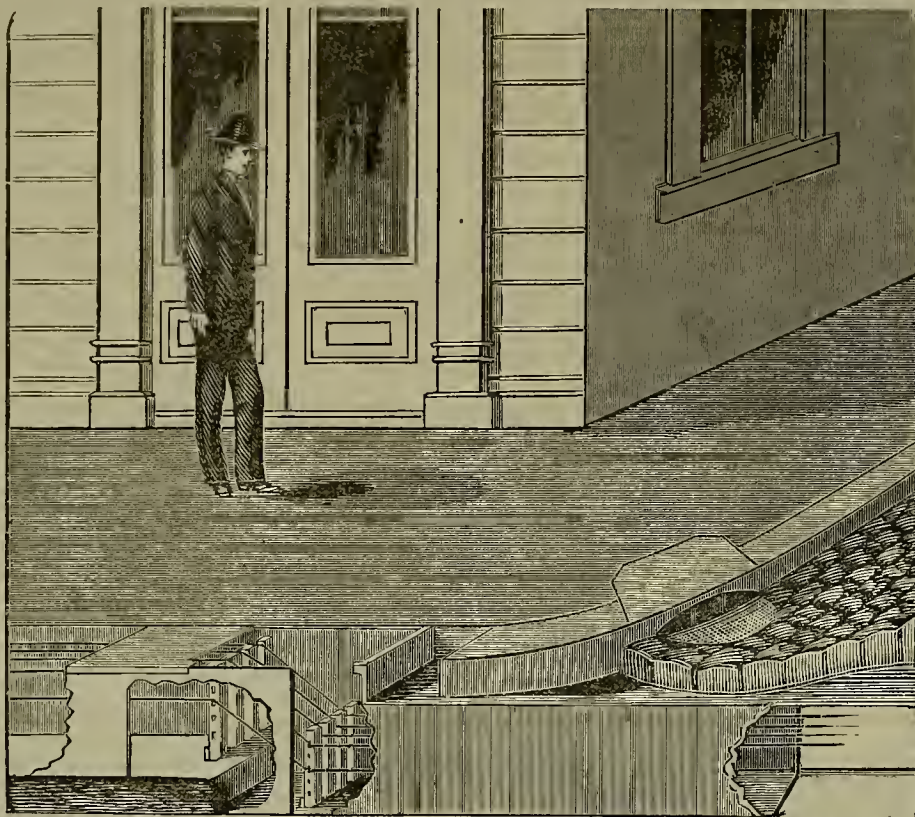


FIG. 3. POSITION OF CONDUIT IN STREET, WITH WIRES READY FOR SERVICE.

were found, weighing half an ounce each. The only obstacle in the way of placer mining successfully on a small scale, in that vicinity, is the vast number of enormous boulders, too massive to move without the aid of powerful machinery.

CARSON MINT.—The Director of the Carson mint has addressed the Secretary of the Treasury suggesting the propriety of appropriating a sum equal to last year's appropriation, so that the operations may be resumed, especially in view of the fact that representations have been made to the mint bureau of the readiness on the

Teggart's Underground Conduit for Electric Wires.

The accompanying illustrations represent a recent invention of Mr. John Teggart, of San Francisco, for doing away with the unsightly telegraph poles which are becoming such serious obstructions and annoyances in all large cities.

Fig. 1 shows a vertical longitudinal section of the apparatus, with sheaves and cable intended for use in laying wires in the conduit. Fig. 2 represents an end view or cross section of the conduit, and Fig. 3 shows the position of conduit in the street with wires ready for service.

This conduit contemplates the utilizing of the curb, or it can be placed in any portion of the street. The advantages to be derived from a use of the curb are manifold, metal curbs, cast hollow with man-holes, *H*, at short intervals to afford easy access to any part of the lines, under the tapping of wires for new connections, a matter of much convenience and at minimum cost.

For the purpose of introducing wires into the conduit after it is in position, an endless cable, *E*, is placed within said conduit, supported by and passing over or around suitably grooved pulleys, *F*, which are journaled upon the side wall. By attaching a wire to this endless cable and connecting the reel, *G*, with one of the pulleys operating the cable, the wire can be introduced for any desired distance into the conduit, and with greater ease and more speed than can be accomplished where poles are in service.

The standards, *B*, support the cross-bars, *C*, within the conduit. By means of numbers placed upon the respective insulators on the cross-bars, the wires can be easily designated so as to make or sever connection, at any given point on the line, with any particular wire. Where telephone connection is desired it would be only necessary to remove the cap from one of the man-holes and connect with the desired wire in the simplest manner possible.

Electricians of prominence and acknowledged authority in such matters have examined Mr. Teggart's invention, and pronounced it practicable in every detail and of a very high order of merit. Much consideration is due to this system of conduit.

In the city of New York, where the question of removing electric wires from poles is a neces-

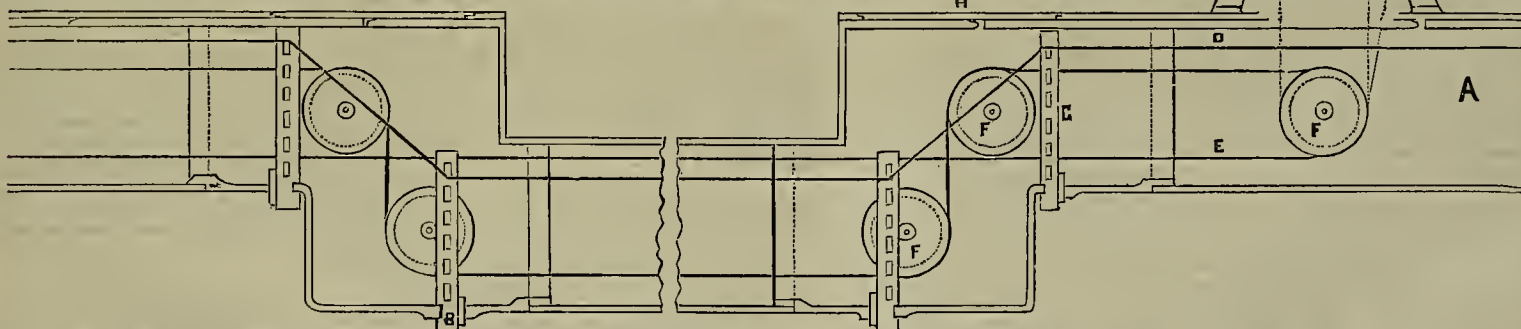


FIG. 1. LONGITUDINAL SECTION OF TEGGART'S UNDERGROUND CONDUIT FOR ELECTRIC WIRES.

gradual rise of the water is measured. The injurious effects of the expelled chlorine on the health of the workmen are avoided. As soon as the vat is filled with water the cover is raised and the wooden discharge faucet opened, from which the solution flows into the precipitation tank. These are of the same size as the chlorination vats, only a little shallower and without a false bottom. The gold is precipi-

part of the producers of bullion to deposit the same at the mint at Carson, instead of sending it to private refiners.

SYCAMORE, that has been useful simply for cigar boxes, comes into fashion for an inside house finish in place of cherry, ash, maple and walnut, and good quarter-cut boards are worth \$50 a thousand,

sity, the underground conduit has demanded much attention, but as yet, so far as we can learn, nothing has been presented equaling Mr. Teggart's system, either in simplicity or utility.

THE Bodie mill is about to cease crushing ore for the Mono Company, and will probably start on Bodie ore in a short time.

MECHANICAL PROGRESS.

American vs. English Steel.

A correspondent of the *Chronicle*, of this city, recently visited several large steel-ware manufactories at the East, with the view of learning whether the best steel was made in this country or imported from Europe. One manufacturer led the way into a long room full of wheels and forges, and walking up to a pile of flat bars, something like thick hoop iron, chose two.

"Here," said he, "are two bars of steel, one of the best English and one of the best American make. Now watch what I am about to do."

The two bars were thrust into a heat of live coke, and held there until both assumed a cherry redness, and then were both plunged into a tub of cold water. Then an end of each was laid on an anvil, a sharp blow was given with a hammer and a corner from each was snapped off.

"Now look at the broken edge and tell me what you see," said this cutler.

"What I see," said the reporter, "is that the broken part looks like the loveliest French gray silk. The grain in each is heartily fine, as though it were a mass of the most beautiful crystals."

"Do you see any difference in the grain of the two?" persisted the cutler.

"Scarcely," was the reply, "and yet I should say that this is a trifle the finer."

"The one you have indicated is American steel," said the cutler. "Now here is another test. Bend a knife-blade, Jim," he said to a workman. The man took a rough but tempered blade from a pile before him, thrust it in a handvice, and leaning his tip on the anvil it bent into a hoop, only to fly back straight again when released. "That's American steel," said the cutler. "Now come upstairs, and I'll show you another test."

In the upstairs rooms a row of men sat behind a row of giant grindstones, grinding razor blades.

"Have you any difficulty putting an edge on these?" asked the cutler of the foreman. "None." "Do they hold the edges?" "Admirably." "Do they hone well?" "Easiest in the world."

"These," said this cutler, "are made of American steel, and I don't think I can answer your question any better. The best steel in the world to-day," he went on, "is the best American steel, and the best cutlery in the world is that which is made out of American steel. Yes, sir, and the best steel workmen to-day are the Americans. Why, when we get an English worker bers with his ability only to do a single class of work, he can't earn his salt until he has learned American ways." In reply to a question as to what proportion of English-made cutlery is imported to-day compared with what was imported five years ago, the reply was as follows:

"That is something outside of my line. I only know that the belief in English cutlery leading the world has gone out of fashion. Not very long ago you had to show imported goods in order to make sales; now the conditions are reversed, and American goods—especially razors, carvers and scissors—receive the preference. The only thing in which we cannot as yet compete successfully with England is the pocket cutlery. But this explanation of that is simple enough. A pen-knife, as you will see, is made up of a number of pieces. There are the tips, the rivets, the plate, the spring, the horn of pearl for the handles, and so on. The English manufacturer gives these pieces out, and the whole family of a workman is employed at some working them into shape at starvation wages. We haven't come to that yet, and I hope we never shall, and until American machinery takes the place of these poor people toiling in their hovels, England is welcome to her monopoly of pocket knives."

"American steel," said another cutler, "is making almost daily progress, and certainly American cutlery in many respects is unequalled. There are many conservative people yet who imagine it is the correct thing to have English knives and forks on their tables, but that idea is rapidly dying out. There is no razor so good as an American razor, of which there are now hundreds of first-class brands, while the American scissors and shears have actually driven the English article out of the market. The American brand on most cutlery now is in fact the selling one."

THE FUTURE OF MACHINERY.—To a representative of a past epoch, says the *American Machinist*, the new applications of machinery and the new methods of manufacture are a revelation, but there are stranger things in store for their successors now coming upon the stage of action. There is yet a vast reserve of mechanical skill to draw upon and the inventive genius of the age is only just beginning to be developed. The skillful machinist of to-day may seem a veritable ignoramus in the eyes of posterity, and the man of the next century will undoubtedly find much in the changes of a single generation to challenge his astonishment and defy his comprehension. We of the present do not realize that a boundless field of discovery is opening up to us and that new explorations are being and will be made. Thus at every step we shall find new and better, shorter and cheaper methods, and that certain principles and devices are capable of being indefinitely

extended. Though past achievements border upon the marvelous, they are but the alphabet to the possibilities of the future.

Welding Iron and Steel.

A series of experiments were recently undertaken by Prof. J. Bauschinger, an English engineer, at the instance of an engineering firm. Similar experiments had previously been made at the Royal Technical Experimental Institute, at Berlin, and by Mr. W. Hupfeld, at Prevali, which gave very different results, those at Berlin being very unfavorable; those at Prevali very favorable, as regarding the welding capacity of steel. Prof. Bauschinger recapitulates the main results of these tests before describing those made by himself. The test pieces were flat, round and square in sections, the largest being 3.149 by 1.181 inches. Each piece was cut in two cold, swelled up on the anvil, when hot, 0.196 to 0.392 inch, and after heating to the proper degree, the two pieces were laid on each other and welded together by hand or steam hammer. Some preliminary studies were made in the laboratory of this college to ascertain the best method for welding and the best flux for steel; a pure coal fire was used.

In the chief experiment the steam hammer was employed. Every piece after welding was tested in the usual way for tensile strength, the limit of elasticity, contraction, extension and ultimate strength being determined, the same quantities having been measured for pieces of exactly similar quality, section and length, but without a weld. The limit of elasticity in both steel and iron is nearly always reduced by welding, and this is, without exception, the case as regards the extension; the contraction of welded is less than that of unwelded pieces when the fracture takes place in the welded portion. The general conclusions arrived at are that for steel the best welding temperature is just at the transition from a red to a white heat; a quick fire and smart handling are necessary, as the pieces should not be long in the fire.

Analyses were made of three samples, one of which welded admirably, the second badly, and the third not at all. Professor Bauschinger is of the opinion that in the case of mild steels, such as those tested, with a low carbon, intended to take the place of bar iron, success or otherwise in welding depends less on the chemical composition than on the chemical treatment.

In this connection we may refer to a paper recently read before the English Institution of Naval Engineers by Mr. Parris, in which, speaking of the different kinds of welds, he gave the preference for heavy work to the scarf weld and considered the long V weld as the next best. He submitted some large specimens of welds made by the use of sledgehammers, screws and the steam hammer. Upon trial all of the welds broke at red heat by being bent, except the one made under the steam hammer, which was repeatedly bent forward and back till black hot and then broke elsewhere than at the weld.

A NEW MATERIAL FOR RAILROAD TIES.—A new and very important application of ozokerite has been recently discovered in Russia; it is now used for making ties in the Transcaspian Railroad, which has already passed Oschatat and nearly reached Merv. The process of manufacture is very simple and inexpensive. Kyr, the local name for ozokerite, is found there in thin layers of 7-in. thickness. In its primitive state it contains a certain percentage of decayed matter. To remove this the ozokerite is melted in large caldrons, the refuse sinks to the bottom, and the pure ozokerite collects at the top. This purified ozokerite, melted and mixed with 75 per cent of limestone and 25 per cent of fine gravel, gives a very good asphalt, which is pressed in boxes shaped like railroad ties. Notwithstanding the high temperature, which reaches 48° R. (140° F.), the ties retain their shape and hardness. These asphalt ties are used all along the road, except at the ends and center of every rail, where as yet wooden ties are employed. In this way about \$800 per mile is economized.

DOES THE PISTON COME TO A STANDSTILL?—At the last meeting of the Engineers' Club of Philadelphia, Mr. Collins offered the following interesting mathematical conundrum: "Does a locomotive piston at the end of each stroke, in reversing its direction, come to a standstill, and if so, can the same be mathematically demonstrated? Also, would a difference in speed affect the duration of its stationary condition, if such exists?" Mr. Collins added: "As the crank pin describes a circle, changing at every point its direction, and therefore having at all times more or less lateral movement, and its movement being continuous, it is argued that the piston can have no movement of rest without the crank pin coming to rest also, supposing perfect joints." Yet this much controverted question is still open for debate—among cranks.

INCREASED ACCURACY IN MEASURING.—The common use in machine shops of measuring instruments of much greater precision than were used ten years ago is one of the signs of improvement. Men who then looked upon micrometers as curiosities now use them daily, much as they formerly used a pair of calipers. This is in part due to the fact that fine measuring tools are now furnished at reasonable cost, but mainly owing to the fact that the demand is for better and different work. Fits are made to measure, and sizes maintained in a way not thought possible a few years ago.

SCIENTIFIC PROGRESS.

Copper in Vegetable and Animal Organisms.

The discussions and complaints growing out of this very reprehensible custom in practice of coloring pickles and canned vegetables by the use of copper, and the numerous lawsuits growing out of the same, have called for numerous analyses to ascertain the extent of the adulteration, and lead to somewhat exhaustive researches which have shown that both vegetable and animal organizations contain naturally a perceptible amount of copper in the form of salts of that metal. Careful analyses show that this amount varies from two-one hundredths of one part in one million to 14 parts in one million. The lesser amount is found in turnips; the larger in wheat bran. Wheat itself contains from four to 10.8 parts, varying, probably, according to the soil upon which it is grown. Barley contains about the same amount. Rice has been found to contain from 1.15 to 6.13 parts and potatoes 2.8. A correspondent of the *American Grocer* gives some further interesting information in this direction, from which we collate as follows:

Odling and Dupre detected copper in 43 different cereals and roots used as food, and in 21 out of 23 samples of flour-bread. It is now universally conceded that copper is present in all vegetables and cereals grown in a soil containing its salts.

These facts show that the question of fraudulent or improper addition of copper to food products turns not on its mere presence, but upon the amount present. Dupre, who has made deep researches in this direction, states that the presence of copper in food in greater proportion than one part per 100,000, indicates that the copper has been added by man, either accidentally or designedly.

The question naturally arises, "What is an injurious amount of copper?" The medicinal dose of copper sulphate, which is the only salt of the metal used for internal medication, is, according to the "United States Dispensatory," of copper sulphate, as tonic or astringent, one-fourth grain, equivalent to .0636 grains of metallic copper. The dose, as an emetic, is from 2 to 5 grains, equivalent to .509 to 1.27 grains.

Medical men generally concede that pure metallic copper is not poisonous. Opinion concerning the poisonous qualities of its salts is divided, but the bulk of opinion seems to be on the side which avers that it is. It is in this form of salts that the metal is present in canned vegetables. The peculiar fact has been brought out by analysis that pickles contain more copper than the liquor in which they are immersed, and some individual pickles contain more than others in the same vessel. This probably arises from the way in which the copper is added—immersing a copper plate in the vat containing the pickles in mass; the pickles nearest the plate receive a larger amount of the metal than those further off. The same would be true of other vegetables so treated.

Copper in the Animal Kingdom.

Copper is also found in the tissues of the higher animals, where its presence is probably accidental, though cases where it has been detected in lower types of animal life have led observers to express the opinion that it is an essential constituent. Eminent chemists have made quite exhaustive analyses and furnished tabular results from which the following is summarized:

In 12 human bodies out of 14, submitted to analyses, the amount of copper in grams averaged from 0.011 to 0.023. The liver contained a much larger proportion than the whole body. The spleen of a man averaged about 0.0617; that of woman 0.0473. Copper has also been found in the kidneys, in the intestines and other isolated parts of the body, and in the blood.

THE USE OF ZINC IN BUILDING.—The extensive outdoor use of zinc by builders at the present time has directed attention to the peculiar process of oxidation which this metal undergoes, and which is so important to be considered in all applications involving exposure. The rusted surface does not rub off or blow away, but forms a sort of hard crust or enamel upon the surface of the metal, and when laid upon boarding which is or may become damp or exposed to steam or condensation below, it rusts on both sides. The thin zincs first introduced in this way were rusted through, brittleness ensuing and failure being the result. But if the zinc be of sufficient thickness, after a certain time oxidation ceases, and the result is a body of solid, sound metal, incased above and below by a solid coating, thoroughly impermeable to the accidents of weather or temperature, and which requires no painting. The various ways of spreading zinc consist mainly in laying it in a corrugated form, without hoarding, the trusses of iron or wood of the roof carrying the weight, or in rafters about one foot, more or less, apart, with a corrugation at each rafter only, or upon a general surface of hoarding, in the manner of a lead flat.

HOW INCANDESCENCE IS PRODUCED.—Incandescence is a white heat, or the glowing whiteness of a body caused by intense heat. The little glass bulbs, says an exchange, with their brilliant horseshoe of glowing filament, attract no more attention than the flickering gas jet,

But the facts about the gas jet are easily and generally understood, while the electric lamp is still a puzzle to many people. Both produce light by incandescence. The molecules of gas are rendered incandescent by the heat generated by the combustion of other molecules. The blue portion of every gas flame is where combustion is taking place, and from there comes the heat which keeps the rest in a state of incandescence. With the electric lamp it is the heat produced by the friction of an electric current compelled to go through a fine carbon filament, which raises that filament to a condition of incandescence and produces light.

AURORA SOUNDS.—In March, 1885, Sophus Tromholt dispatched some thousand circulars to all parts of Norway containing different queries regarding the aurora, and among them also the following: "Have you or your acquaintances ever heard any sound during aurora, and, in this case, when and in what manner?" Up to September 16th, he had received answers to these queries from 144 persons. Of these not less than 92, or 64 per cent, believe in the existence of the aurora-sound, and 53 (36 per cent) state that they have heard it themselves, while the other 39 cite testimonials from other people; only 21 (15 per cent) declare that they have never heard the sound and know nothing about it, and the other 31 (22 per cent) have not noticed this query at all. There are thus 92 affirmations against 21 negations. The sound is variously described in these answers as sizzling, creaking, whizzing, rustling, crackling, hissing, whispering, rushing, buzzing, rippling, roaring, din, breezy, whipping, fanning, clashing, flapping, sweeping, etc. —*Nature*.

STOCK AND GRAFT.—Some observations have been made by Strashurger recently on the reciprocal influence of stock and graft, and on the limits within which plants that are specifically distinct will permit of grafting or budding. He succeeded in grafting *Datura Stramonium* on *Solanum tuberosum*. The resulting plant produced good-sized tubers which contained a small quantity of atropine. But what is still more remarkable, he successfully grafted *Schizanthus Grahami* on *Solanum*, these plants belonging to distinct natural orders, the former to the Scrophulariaceae and the latter to the Solanaceae. It is the first instance on record where a union of this kind has been accomplished between plants so remote in their relationship. A novelty in horticulture in California is the successful grafting of Italian chestnuts on the ordinary black oak. It has been practiced with the best results in a number of instances in the Napa valley.

THE FOOT OF A HORSE.—The foot of a horse is one of the most ingenious and unexampled pieces of mechanism in animal structure. The hoof contains a series of vertical and thin laminae of horn, amounting to about 500, and forming a complete lining to it. In this are fitted as many laminae belonging to the coffin-bone, while both sets are elastic and adherent. The edges of a quire of paper inserted leaf by leaf into another will convey a sufficient idea of the arrangement. Thus the weight of this animal is supported by as many elastic springs as there are laminae in all the feet, amounting to about 4000, distributed in the most secure manner, since every spring is acted on in an oblique direction.

THE WORLD MUST MOVE.—In 1877 electric lighting by the incandescent system was declared by many to be contrary to scientific principles. The same was said of the use of iron, and later of steel, in bridge building. The Suez canal was once denounced as a wild and foolish scheme. Less than 50 years ago educated mechanics asserted that steamships could never carry enough coal for a long ocean voyage. Leading ship-builders told us that iron ships could not swim, and when one or two floated it was said that they would not hold together permanently. Rolls for flour making were once hooted and derided. The world will not stand still for any one.

SPIDERS AND FORESTS.—Dr. C. Keller, of Zurich, claims that spiders perform an important part in the preservation of forests, by defending the trees against the depredation of aphides and insects. He has examined a great many spiders, both in their viscera and by feeding them in captivity, and has found them to be voracious destroyers of these pests; and he believes that the spiders to a particular forest do more effective work of this kind than all the insect-eating birds that inhabit it. He has verified his views by observations on coniferous trees, a few broad-leaved trees, and apple trees.

GAS AND ELECTRICITY.—Experiments have proven that gas will furnish more light when used to drive an electric motor than when used directly as an illuminant. In a paper recently read before the Kings College Engineering Society of London, it was mentioned as the result of many experiments that 1000 feet of gas used to produce incandescent electric lighting by means of a gas engine would give twice as much light as it would if employed as an illuminant in the ordinary way.

ELECTRIC LIGHTING BY INDUCTION.—On the British ship *Colossus*, belonging to the navy, electric hand-lamps are in use. They have no external connections but act by induction.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BICYCLE SADDLE.—John Payne, S. F. No. 342,925. Dated June 1, 1886. This new saddle is intended to allow great freedom of movement and to admit of perfect adjustment to varying weights and conditions. It consists of a flexible suspension saddle, the front end of which is connected with a lever or levers turning upon a journal-pin fixed to the neck of the machine and the rear end connected to the upper end of similar levers fulcrumed upon a standard which is fixed to the back-bone of the machine. The lower ends of the front and rear levers are united by longitudinally working springs having both a vertical and a longitudinal adjustment by which the action of the saddle and the degree of tension may be regulated.

LIFE-RAFT.—C. J. Ifendry, assignor to Leduc Tule Improvement Co., S. F. No. 343,028. Dated June 1, 1886. In making life-rafts it is customary to unite two or more hollow, air-tight cylinders by a framework, which maintains them on a plane side by side, but these often become broken, perforated and useless in time of need. In making this new raft, the inventor takes the round and pithy stock of the reed known as the "tule," so abundant in California, which is extremely light and buoyant, and from its cellular structure does not become water-soaked and heavy, and he binds them together in cylindrical masses of sufficient diameter, the cylinders being from five to thirty feet in length. These reed cylinders are then covered with canvas, which is painted. The ends are protected by metallic caps. Suitable framework and straps form a hindering medium to make the raft in the desired shape.

TRANSFER APPARATUS FOR SAWMILLS.—Geo. W. Loggie, Portland, Or. No. 342,918. Dated June 1, 1886. This is an apparatus for transferring lumber in sawmills or on iron rails or other transfer work. It consists of stationary skids or timbers upon which the cant or lumber falls after passing the saw, the skids extending transversely to the line of the cant, a series of parallel skids mounted so as to oscillate about double centers or fulcrums, and a mechanism whereby one end or the other may be raised above its fulcrum at will. In combination with these movable levers skids are traveling chains so arranged that when the skids and chains are raised about the stationary skids, the timber will be carried upon them from one side to a point beyond the center, and from this point may be carried by raising the opposite end to the point of delivery. This apparatus is specially useful in mills where the logs are first sawed into large pieces called "cants," which must afterward be reassembled by a second sawing apparatus, and it is placed in such a position that after the log has passed the saw the cant may fall directly upon this apparatus, and by raising that end of the chains or skids the cant will lie upon them, and thus be carried across to a point more than half way, or beyond the center, where it can be taken up by raising the opposite ends of the chain skids and carried the remainder of the distance across to the opposite side.

Leadville's Bullion Yield.

Leadville is turning out considerable high grade bullion and also keeping the gross production in advance of last year's product. Considering the many disadvantages experienced by both miners and smelters, the yield of bullion thus far this year has been surprising. The *Herald-Democrat* makes a comparison for the first four months of the present year with 1885, which shows a gain of nearly 900 tons, as follows:

	1885.	1886.
January (tons of bullion).....	2,050	1,103
February (tons of bullion).....	1,035	2,482
March (tons of bullion).....	2,175	1,630
April (tons of bullion).....	1,665	1,280
Total.....	7,975	6,693

Gain for 1886, 881 tons.

The value per ton of the bullion shipped could not be ascertained, but it is unquestionably greater than it was last year, as the ore is averaging far better. Another feature calculated to improve the average silver and gold contents of Leadville base bullion are the desilvering furnaces, erected lately at the Elgin, La Plata and American smelters. By this innovation a large portion of the furnace production of the smelters is desilvered, and the bars of lead sent out caused to contain two to five times as much silver and gold as the original pigs of lead did on coming from the smelting furnaces. Not only have the shipments of bullion been fair this year, but the amount of ore shipped to the valley smelters has increased, and the indications now are that Leadville will send out more lead and precious metals than at any time in the past.

THE new leads on Mosquito creek, Cassiar, which were struck by the miners who remained and prosecuted the tunneling during the winter, are said to be of very rich indications, and something like a new rush to that camp seems probable.

USEFUL INFORMATION.

"LA NATURE" claims that a machine of one-horse power would keep 27,000,000 watches running.

TO REMOVE VARNISH without injuring paint, brush on spirits of ammonia or hartshorn, which softens the oil, allowing of its being rubbed off easily.

FILING BAND SAWS.—The use of a rounded file is recommended for filing hand saws to prevent sharp angles, a common cause of breaking.

A HOT MIXTURE of one-third paraffine and two-thirds gutta percha, forced into the pores of wood, is winning favor as a means of preventing decay.

IT IS NOW recommended to nail shingles intended for a roof in a solution of lime and salt. It is claimed that it adds a good many years to the usefulness of the shingle—by preventing them from decaying.

TO FASTEN ON LAMP TOPS.—A very good cement to fasten on lamp tops is melted alum. Use as soon as melted, and the lamp is ready for use as soon as the cement is cold. Plaster of Paris is generally used for that purpose.

TEMPERING MAINSPRINGS FOR GUNS.—Heat the spring to a good red and plunge it in the water, then take a fat pine splinter and smoke the spring well all over; next heat it until the smoke burns off; then dip the spring in the water.

A SUBSTITUTE FOR OIL IN DRILLING.—A very superior mixture may be made as follows: Take spirits of turpentine and put into it as much camphor gum as it will dissolve. With this composition there will be no trouble in drilling anything hard.

BLACKBOARD COMPOSITION.—Make a thin paste of lampblack and flour emery with shellac varnish, and apply the same to the wall or board to be coated. Should the mixture be too thick, it may be thinned down to the right consistency by adding alcohol.

HARMONY OF COLORS.—Red looks well with black, white or yellow; blue harmonizes with white or yellow; green, with white, black or yellow; gold, with black or brown. White appears well with any color. Purple, pink and white harmonize beautifully.

FRUIT STAINS upon cloth or upon the hands may be removed by rubbing them with the juice of ripe tomatoes. If applied immediately, powdered starch will also take stains out of table linen. Left on the spot a few hours it absorbs every trace of the stain.

PIPE CLAY made into a paste with cold water will, it is said, remove grease stains from papered or plastered walls if put on without rubbing, let stay over night, and then brushed off lightly. Where the grease has been on for some time several applications may be needed.

KEEPING COAL.—It is not generally known that coal is less valuable for having long remained in store perfectly dry. Most coal mines are saturated with water, and if the water is drained off the coal becomes flinty and valueless. Coal stored through the summer should be sprinkled and kept moist.

TO PREVENT THE CRACKING of wooden fan-cets, etc., put the articles in melting paraffine, and heat them there at a temperature of 212 degrees F., until bubbles of air cease to escape from the wood. The whole is then allowed to cool to about 120 degrees F., when the wood is taken from the bath and cleaned from the adhering paraffine by rubbing with a dry piece of cloth.

SPOTS ON BRASS.—Sulphuric acid will remove spots from brass that will not yield to oxalic acid. It may be applied with a brush, but great care must be taken that no drop of the acid shall come in contact with clothes or skin, as it is ruinous to garments and cuticle. Bath brick or rotten-stone may be used for polishing, the latter being preferable for delicate work.

FOR A RUST JOINT.—For making a rust joint that will bear heat, cold and rough usage, the following formula has been highly recommended: Ten parts iron filings, three parts chloride of lime, and enough water to make into paste. Put the mixture in between the pieces to be joined and bolt them together, leaving until dry. After 12 hours the cement has been known to break off the solid iron.

TO PRESERVE MILK INDEFINITELY.—Pour the milk into a bottle and place the vessel up to its neck in a saucenpanful of water, which is then to be put on the fire and allowed to boil for a quarter of an hour. The bottle is now to be removed from the water and carefully closed with a good and tight-fitting cork, so as to render it as air-tight as possible. Milk which has been preserved by this process has been kept for more than a year without turning sour. Milk may also be preserved by putting a table-

spoonful of horseradish, scraped in shreds, into a panful of milk. When milk thus treated is kept in a cool place it will be found to keep good for several days, even in hot weather.

ARTIFICIAL SPONGE made of cotton, rendered absorbent and treated with antiseptics, has been invented in England. A piece of the size of a walnut has absorbed water until it reached the size of a cocoanut. It is so cheap that it need be used but once.

CONVENIENT WAY OF WATERPROOFING CLOTH.—It is found that when paraffine is thoroughly mixed with linseed oil, cast into small blocks, and cooled, it may be used to make any fabric, as cloth, felt and leather, waterproof, by rubbing it with such a block, and ironing afterward to equalize the distribution of the material in the pores. If too much is not put on, the material may be made to be only impervious to water, but not to air, the small greasy pores repelling water, but not air.

KRUPP'S GUNS.—Advices from Constantinople would make it appear that the cannon made by Krupp for the Turkish Government are not of the best. It is stated that a series of experiments have been in progress in the Dardanelles to test the merits of several of the new Krupp guns; that several have burst, killing a number of gunners, and that a number of guns have been found to be worthless. It is added that attempts have been made to keep these disasters secret, but without avail.

GREASING BELTS.—Some one writes: "I noticed an engineer the other day doctoring a belt to prevent its slipping by pouring grease on it and then fine resin to cover it all. If I had been his employer I would have told him how to do better, and a repetition would have brought him his walking papers. It costs a great deal to buy belts to be used that way, for they would be short-lived. Good neatfoot or castor oil applied to belts occasionally Saturday nights is good treatment, but such treatment as the above is very injurious to a belt."

MILK SUGAR.—The extraction of milk sugar from whey is a comparatively new industry. In Burlington, Vt., a company was organized and a factory built, last summer, for the purpose. Contracts have been made with a number of farmers in the vicinity sending milk to the cheese factories to furnish the company all their whey for five years. The demand for the sugar is so great that contracts are now being made by Prof. Sabin, of the State University of Vermont, with western farmers for larger supplies of whey than are readily obtained from small New England factories.—*Ex.*

GOOD HEALTH.

A Victim of the Cigarette.

Woerishoffer, the dead speculator, will live in history as one of the most brilliant and daring of the Wall-street millionaires. Like Gould, he began life in poverty. He started as an office boy, developed into a clerk, and finally blossomed out as a speculator. For 20 years this man has been engaged in the heaviest financial battles of modern times. The capitalists of the metropolis recognized his generalship and looked up to him as a leader. He was a hard fighter, and he was generally successful. It is passing strange that such a man, gifted with a superb will-power, should have been slain in the most inglorious of conflicts and vanquished by the puniest of antagonists. This Colossus met his fate when he tackled the cigarette. A brief history of the struggle may serve to point a moral and convey a warning. Woerishoffer gradually drifted into the habit of inveterate smoking. He smoked 50 cigarettes a day. He kept it up for 15 years, inhaling the smoke all the time. Years ago Woerishoffer saw danger ahead. His head, heart, stomach and nerves remonstrated, protested and begged him to change his course. In their agony they cried out against the fiendish cigarette, and denounced it. Colossus grinned sardonically. When he got ready he would down the cigarette and not before. Slowly but surely the coils of smoke twined around their victim, and tightened their grip each day. The man's heart turned into a big sponge saturated with nicotine. Still the smoker continued the fight. He would lie down when too feeble to stand, and smoke, while his heart beat at the rate of 120 a minute. He said: "I have a German stomach, an American head; I am equal to anything." At last he became alarmed. To his horror and amazement he found that he could not give up the cigarette. He tried time and again. He went to a famous medical man and said: "You shall have \$50,000 in gold if you will emancipate me from the cigarette." The physician worked hard, but it was no go. The big, strong man, the giant who tossed money-kings about like babies, lay hopelessly crushed under a little rice-paper pigmy. "A remarkable case," the medical men say. Very; but there will be others like it.

The above, from the *Atlanta Constitution*, conveys a most impressive lesson, which ought to be brought home to every inveterate smoker, and, for that, to every young beginner in the use of the cigarette or cigar. How many hundreds of our young boys are now walking the streets of this city picking up and smoking

castaway cigarettes and cigar stumps—the disgusting practice—who will yet live to see the day that they will rue the time when they first commenced the practice of smoking. The rapid increase of this habit bids fair to soon rival that of the intemperance use of ardent spirits. The Germans are the most inveterate smokers in the world, but the Government of that country is already taking measures to curtail it, especially among the young. It is positively interdicted among the newcomers into the military service, while under the direct control of its officers, and that includes several years' service from every able-bodied man in the nation. It is high time that some measures were taken in this country with the same object in view.

The Great Question of the Day.

The late Dr. Samuel D. Gross, the father of American surgery, used the following words in an address delivered at the dedication of the McDowell monument:

"Young men of America, listen to the voice of one who has grown old in his profession, and who will probably never address you again, as he utters a parting word of advice.

"The great question of the day is not this operation or that, not ovariotomy or lithotomy, or a hip joint amputation, which have reflected so much glory upon American medicine, but preventive medicine, the hygiene of our persons, our dwellings, our streets—in a word, our surroundings, whatever or wherever they may be, whether in city, town, hamlet or country, and the establishment of efficient town and State boards of health, through whose agency we shall be more able to prevent the origin and fatal effects of what are known as the zymotic or preventable diseases which carry so much woe and sorrow into our families, and often sweep like hurricanes over the earth, destroying millions of human lives in an incredibly short time.

"The day has arrived when the people must be aroused to a deeper and more earnest sense of the people's welfare, and suitable measures adopted for the protection as well as for the better development of their physical, moral and intellectual powers. This is the great problem of the day, the question which you, as the representatives of the rising generation of physicians, should urge, in season and out of season, upon the attention of your fellow-citizens; the question which, above and beyond all others, should engage your most serious thoughts, and elicit your most earnest co-operation.

"When this great object shall be attained; when man shall be able to prevent disease, and to reach, with little or no suffering, his three-score years and ten, so graphically described by the Psalmist, then, and not until then, will the world be a paradise."

HEALTHY EMPLOYMENTS.—An Italian doctor has lately asserted that the workmen in borax factories appear to possess a charm against the attacks of cholera. During the terrible epidemic of 1864-65 the workmen in seven contiguous factories in Italy were quite free from the disease, which killed off one-third of the population of a village in the immediate neighborhood. He recommends the internal administration of borax as a specific for cholera in doses of five grains (77 grains) each day. He believes that it not only destroys the microbes in the intestinal canal, but also in the blood. The doctors, on the authority of the *Atlanta Constitution*, say that tobacco manufacture of all kinds, both the preparation of the raw material and its manufacture into cigars and cigarettes, is the healthiest business in the world. In the latter branch, while the work is largely done by girls, it is said the employees are seldom sick, and present a marked contrast with girls employed in cotton factories. We wish as much could be said of the consumption of tobacco.

FOOD AND CONSCIENCE.—Never go to bed in any danger of being hungry. People are kept awake by hunger quite as much as by a bad conscience. Remembering that sleep is the essential force which the whole scheme starts, decline tea or coffee within the last six hours before going to bed. If the womenkind insist, you may have your milk and water at the tea-table covered with tea; but the less the better. Avoid all mathematics or intricate study of any sort in the last six hours. This is the stuff dreams are made of, and hot heads, and the nuisances of waking hours. Keep your conscience clear. Remember that because the work of life is infinite, you cannot do the whole of it in any limited period of time, and that therefore you may just as well leave off in one place as another.—*Edward Everett Hale.*

THE DYING.—A leading physician says that a patient who is lying dying of exhaustion is generally dying of starvation. We give him beef tea, calf's-foot jelly, seltzer and milk—that is, a small quantity of the sugar of milk and some fat; but the jelly is the poorest sort of food, and the beef tea is a mere stimulant. The popular belief that beef tea contains "the very strength of the meat" is a terrible error; it has no food value.

SEAT OF PAIN.—Pain, the *Scientific American* says, is chiefly mental, and the severity of it would be comparatively slight did we not give ourselves up to it. Animals suffer less than men. A horse will feed after breaking a leg, while a man would lie and moan.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

RESUMED CRUSHING.—Amador Ledger, June 12: The Amador Queen mill resumed crushing on Tuesday, after 10 days' idleness, caused by the breaking of one of the jaws of the ore-crusher. The Zeile mill was started again early in the week. The hole in the reservoir occurred in the vicinity of the pipe, and was caused, it is supposed, by a defect in the laying of the pipe, and not on account of any weakness of the banks. About 100 feet of pipe collapsed when the reservoir broke, and this was the cause of the stoppage of the mill. The work of putting in the new pump is progressing at the Downs mine. They expect to commence sinking about the first of next month.

SUTTER CREEK.—The Lincoln mine is running along at the usual gait; the employees are to be paid off this week. The work of hauling the 10-stamp mill from Angels, Calaveras county, to the Iowa mine here is almost finished. Only one load more remains to be hauled. The work of putting up the mill will commence forthwith. There are no new developments to report in connection with the Eureka, except that the men are busily engaged in putting the new air compressor in place.

Calaveras.

INDIAN CREEK.—Mt. Echo, June 9: The Woods mine is at the present mining some very valuable ore. The dump is constantly filled with the gold-bearing rock so famous in this section. A large force of men will be placed on duty as soon as the necessary milling preparations are made, and a vigorous "boom" will follow. The richest ore extracted in Indian Creek for many years is being stopped at present. The next yield bids fair as crowning all previous productions. The Calaveras mine is making good progress. Stopping is being carried on vigorously in the western stopes where some very rich ore has recently been discovered. The mill has been kept in constant motion and the batteries make a wonderful showing. All seems to be life and activity at the Calaveras at present. A very handsome cleanup was made last Sunday, in fact, the best for many months. The Bean mine, owned and controlled by Mr. James Bean, is pushing forward in a systematic manner. A well-defined ledge of three feet is displayed in the shaft, to which a tunnel now 150 feet in length is being run to tap the main body, and which is at present within a few feet of its destination. The Sature mine, situated a short distance from Murphey's, is making a magnificent display of fine-paying ore, immense in quantity and rich in quality. This mine was recently bonded for \$50,000 to a Boston company and will be accepted the 1st of June. The property is a very valuable one, and the present owner is Mr. John Sature. The Kelley mine, which for some time past has been worked on a real systematic scale, has been accepted at the figure asked by the proprietors. The sum is \$100,000. Indian Creek as a quartz-mining center cannot be equaled elsewhere in the State. Its mines are constantly pouring forth its auriferous yields in abundance and making good returns to its proprietors.

Inyo.

THE COLDWATER MILL.—Inyo Register, June 10: A correspondent informs us that the failure of the old Sacramento mill, recently put up in Coldwater canyon, is only partial, due in part to the bursting of the water pipe. The pipe put in is too light for the 180-foot pressure put upon it. Mr. Melvin, the builder, intends to change about 200 feet for heavier cast-iron pipe. Mr. La Grange, superintendent of the Casey mine, has a mule-train packing ore to the mill. A small force of men are now at work in the mine.

Napa.

ÆTNA MINES.—Napa Register, June 9: While in Pope Valley the other day we took a run up to the mines—the Washington and Star—which now come under the general name of "Ætina." We found the superintendent, M. G. Rhodes, who is also one of the owners, in his office, on the site of the old Phoenix mine, and with him inspected the Star mine, near by. After going over the surface we donned a miner's suit, boarded the cage and went by way of the main shaft to the tunnels, crosscuts, stopes, etc., 375 feet below. The coarse ore is smelted at the furnace located just below the mine and the finer stuff is conveyed by car over a tramway to the furnace at the Washington mine, over half a mile away. Though these mines yield low-grade ore, they pay well under the able management of Mr. Rhodes, the Ætina being one of the five quicksilver mines now in the State that are producing. Seventy men are employed and 350 flasks of mercury is the average monthly shipment.

Nevada.

PITTSBURG MINE.—Grass Valley Union, June 12: The water in the Pittsburg mine has been lowered to the 600 level, and a steam pump is now being put in which will drain the mine to the bottom, which is 900 feet. It will take several weeks to accomplish this, as there is a large extent of ground opened down to the 8th level. When all the water is out of the mine tribute contracts will be let to take out ore on the different levels down to the 7th, as there is yet plenty of ore in the stopes. No ground has ever been opened below the 8th level, although the shaft is down to the point where the 9th level is to be opened, and where the ledge is of good size and of fine milling quality. Preparations are also being made to introduce water-power for doing the pumping and hoisting, which will be completed within a month. The water will be brought in from the South Yuba canal, the supply ditch, reservoir and tank having already been constructed. A pressure of 200 feet will be obtained, and with a five-foot wheel all requisite power for pumping and hoisting will be had, as the left of water will be up to the 300 level, where it will be discharged through the drain tunnel. It is in further contemplation to introduce water-power to run the company's 10-stamp mill, but this will not be done until the lower levels are opened and yielding a regular supply of ore. The Pittsburg mine has a good history. It has yielded over \$1,000,000, and when underground work was

suspended several years ago a good ledge was showing at the bottom, but the machinery was not sufficiently strong to handle the water. In the meantime a long drain tunnel has been run to command the water to the depth of the 300 level, and this having been completed all arrangements are now being perfected to start up the mine again with an adequate force.

THE BADGER MINE.—The work of pumping out the Badger shaft goes steadily on. Thursday but very little progress was made in lowering the water, owing to the old cross-drifts and stopes being filled; but yesterday morning the water was brought below these drifts and the pump was gaining rapidly. The shaft is now clear of water to a depth of about 75 feet, and it is thought the whole shaft will be drained in a few more days.

Placer.

REPAIRING MILL.—Placer Republican, June 6: Since the Rising Sun and Big Oak Tree mines consolidated, the manager has been overhauling and repairing the old 20-stamp mill on the Rising Sun ground so thoroughly that it amounts almost to the building of a new mill. There will be new and improved concentrators and it is expected the mill will be at work in two weeks. In the meantime 20 miners are taking ore out of the Big Oak as fast as they can drift, no stopping being done at present, and a big dump is ready for crushing.

TUNNEL.—The tunnel of the Dam mine near Michigan Bluff is now in 4000 feet. Good pay has been found and the force of men has been increased. Eight of the ten shares of stock are held by Ed Polifka, one by C. F. Morgan, and one by Nathan Dinsmore.

IOWA HILL.—W. L. McKewen, U. S. deputy marshal, passed through town Friday, with several quartz miners, whom he intends putting to work on the old Poole ledge in Humboldt canyon. The tunnel at the McIntire mine, Giant Gap, is in 800 feet, and an incline runs 150 feet further. They have sunk their incline on the west rim of the channel with the bedrock pitching off at an angle of 45 degrees. They are running the incline east across the channel, the bedrock still pitching, and expect to break through into pay gravel at any moment. Mr. McIntire's perseverance and energy deserve success. The Watts brothers' drift mine at Monona Flat yielded 70 ounces of gold as the result of last week's work with three men. This mine is a regular bonanza to the popular Watts brothers.

IOWA HILL.—Argus, June 10: J. B. Hobson lately took a contract for running a 500-foot bedrock tunnel in the Morning Star mine. The prospects of that mine are very promising. Work was begun in the Sucker Flat mine by a small force of men under the superintendency of Mr. G. Hoffman.

Shasta.

QUARTZ AND PLACER.—Shasta Co. Democrat, June 9: F. B. Simonds, Sr., came down from Squaw creek yesterday and reports that camp booming. J. Vanoy is showing up a fine body of ore on the Newton, the claim adjoining the Uncle Sam, on Squaw creek. W. W. Nichols, of Copley, reports that Moore & Morton have "struck it rich" in their mine on Flat creek they recently purchased from an Indian for \$200. Three prospectors named L. E. Van Vliet, J. S. Shaffer and W. F. Doran, took out over \$1000 in the past two weeks, in a pocket ledge they discovered across from Middle creek station. Sunderhaus, Busch & Co. have commenced lively work on their mines they lately purchased on Squaw creek. They have shipped a large quantity of tools and provisions, and have put about 20 men to work already, at good wages.

DEADWOOD.—Cor. Shasta Courier, June 12: The largest coal-pit ever burnt in Deadwood, and probably in Trinity county, was completed last week by J. P. Hall & Co. It consists of 2000 bushels, the whole of which is for the use of the Brown Bear and McDonald Bros. mining companies. Belleau & Co. have a large force of men at work moving their mill and preparing for its reception on their new mill site. The contract for timbers for McDonald Brothers' new tunnel was let to-day to J. P. Hall & Co. It is to be six feet in the clear, and is expected to run from 1000 to 1500 feet. Everything about the timbering is to be substantial, nothing less than 8x8, from that up to 16. It may take a year or two to complete it.

Siskiyou.

SCOTT'S BAR.—Yreka Union, June 10: Bennett & Co. are about to start up operations in their claim back of Chinatown. J. Garretson & Co. are working in their hydraulic claim on Quartz hill. Their claim is continually sliding, which makes it easy pipping. Mr. McMurtry is talking of locating a quartz lead on top of Mt. Diablo, east of Scott's Bar.

QUARTZ ON KNOWNOTHING CREEK.—Numerous and remarkably rich discoveries in quartz continue to be made on Knownothing creek, a tributary of the South Fork of Salmon which comes in about four miles below Methodist creek. It is a comparatively new mining district, but it abounds with rich prospects and has a future as bright as New river or any of the new camps in the northern part of the State. Thomas Macaulay, an experienced quartz miner, writes to friends at Oro Fino that, in his opinion, the largest and richest ledges in the county are to be found among the recent discoveries upon Knownothing creek, and he has great faith in their future. The mines on Methodist creek continue to prospect richly, but we hear of no new discoveries.

Sierra.

PROSPECTING.—Sierra Tribune, June 11: Tuesday, Joe Perry and Dr. Hutchins left town before any but the very earliest birds were astir, on a prospecting trip. They were mounted on their own good legs, carried with them a pole pick and a com-misara in a tin pail. Crossing the river on a shaky log, opposite town, they struck out up the mountain. The hill is steep, and before they reached the top Joe asked the doctor how far it was to town. The doctor said he thought it was about 25 miles. They followed the river divide for several miles and came out on the South Fork, two miles above town. Several ledges were found and one location made. The snow is nearly all gone on the ridge, and they say there is a splendid country on that side of the river in which to prospect.

CHANGE OF SUPERINTENDENTS.—M. H. Mead has resigned the superintendency of the Young America mine. Mr. Mead was compelled to resign on account of other business demanding his

attention. Steve Moore, of Grass Valley, has been appointed to the position. Mr. Moore came up Wednesday evening. He is said to be one of the best miners on the coast. He was at one time superintendent of the Colombo mine of this district.

AT WORK.—Mt. Messenger, June 12: A. Vanslyke has several men at work on his quartz mine, near Butcher ranch, and will put on more men as soon as the snow gets off so that he can work to advantage. In a short time now he will have his engine at work, pumping the water out of the shaft. Jo Logarmisino is developing a very promising quartz ledge, situated upon the ridge between Butcher ranch and gold valley. He has a shaft down about 20 feet, and the ledge is four feet in width, of excellent quartz. He has some eight or ten men at work, sinking on the ledge and building a house. Wide Awake Company, Alabama Hill, have lately started a new tunnel, in now about 40 feet. Four feet per day is made, with one shift. It is expected to tap the pay lead about 300 feet ahead.

Trinity.

MINING MACHINERY.—Trinity Journal, June 11: Amos Melton and Henry Martin of the Brown Bear Mining Company, Deadwood district, were in town this week. At present the mill is shut down, as an additional battery of five stamps, new boiler and two more concentrators are being put in. Work in the mine is going forward and the usual quantity of quartz of regular richness is being taken out. The supply of rock is practically unlimited, as 15 men can easily supply all that can be crushed by the 15 stamps which will be in operation when the present additions are completed, in about three weeks from this date.

MOVING A MILL.—Messrs. Frank Balleau & Co. have purchased the Huntington mill and engine recently used on the Vermont mine by Pearson & Co., and are now moving it to the Belleau mine, Deadwood district. Good reports are anticipated from the latter mine when they get to crushing rock and taking out bullion.

HAY FORK QUARTZ.—A partial cleanup of the arastra on Hay Fork is said to have been very satisfactory to the parties interested.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Virginia Enterprise, June 12: On the 2900 level the face of the north lateral drift is in a promising vein formation of quartz, porphyry and clay, but, as a small seepage of water comes in, the diamond drill has been started from the face and is driven straight ahead toward the Savage line, in order to feel for and guard against any possible strong influx of water from that direction, and also to measurably prospect the ground before advancing the drift further. On the 3200 level the lateral drift south, from the bottom of the deep winze, is out 94 feet, and has about 170 feet further to go in order to connect with the Combination shaft. Nothing further is to be done with the fine ore deposits found in the explorations above the 3100 level at present, or until the Combination shaft is sunk and connection made with it through the drift on the 3200 level. With the present heavy discount on silver, the ore is well enough where it is.

CHOLLAR.—The Chollar-Norcross-Savage or Combination shaft is now down 34 feet below the 3200 level, making a total of 234 feet in depth. The sump or drainage well portion of the shaft is now being sunk. About 50 feet will be required for this, making it, when completed, 50 feet below the 3200 level, or 3250 feet in perpendicular depth from the top to the bottom of the shaft. It is calculated that this 50-foot sump will be completed about next Wednesday, after which the station at the 3200 level will be opened for a drift north to connect with the drift now coming from the Hale and Norcross deep winze on that level. This station will be in reality eight feet below the 3200 level, in order to correspond with the grade of the Norcross drift. The bottom of the shaft is in excellent sinking ground, principally porphyry and clay, with considerable quartz and no increase of water. In fact, since the shaft entered the ore channel no water has been encountered worth speaking of.

SAVAGE.—On the 600 level the main lateral drift south is in 165 feet from the Gould and Curry south line, and has about 200 feet farther to go in order to reach and connect with the main Savage shaft. The material in its face is principally quartz of a very promising character, carrying spots of good ore. The crosscut east from this main drift is out 55 feet, and has cut into stringers of ore which assay well, and showing improvement as farther passed into.

CON. CALIFORNIA AND VIRGINIA.—The daily output of ore from the various producing sections is about 400 tons per day, the old stopes and breasts holding out well, but the quality of the ore does not hold out as well as the quantity, the assays from the mill battery samples averaging only about \$10 per ton. Active explorations are constantly carried forward at various eligible points with a view to finding something better, or more of the same.

GOULD AND CURRY.—The upraise incline is 63 feet above the 500 level, following the slope of the vein, 33 feet having been added during the week. The west crosscut from the upraise, on this level, was advanced 10 feet, making a total length of 79 feet. Material at both points principally quartz of very low grade.

SIERRA NEVADA.—On the 520 level the new lateral drift north from crosscut No. 2 has been extended 57 feet, making a total length of 78 feet. The lateral drift south at this same point was extended seven feet, making a total length of 29 feet. Both drifts are in very promising vein matter with no water.

BEST AND BELCHER.—The water in the Osbiston shaft has been lowered 11½ feet, leaving 16 feet farther to reduce in order to reach the track floor of the 2300 or bottom level, which corresponds with the 2500 level of the C. and C. shaft.

POTOSI.—Very little progress has been made in the diamond drill explorations to the eastward since last week's report. The proposed new drill hole, 75 feet farther south, mentioned last week, will be started to-morrow, preparations being now in progress to that effect.

YELLOW JACKET.—Daily yield 140 tons of low grade from the various old stopes and breasts from

the 1300 level up. Considerable dead work continues to be done in the way of explorations at various points for more ore.

CROWN POINT AND BELCHER.—Daily yield 375 tons. Some little improvement is reported in the quality of the ore between the 1750 and 1600 levels, otherwise the character of the general yield is about the same as heretofore.

MONTE CRISTO.—Work is still concentrated on running the drift west from the new shaft on the 150 level. The rock is hard, and advancement correspondingly slow.

OPHIR.—The main south drift on the 300 level has cut through into the old workings and is now running in a vein or deposit of low-grade ore.

KENTUCK.—The old workings continue their daily yield of about 60 tons of low-grade ore, taken from various points above the 1300 level.

ALTA.—Still drifting on the 700 level to connect with the old workings of the Lady Washington mine.

Bell District.

PROGRESSING.—Belmont Courier, June 9: Work is progressing steadily in one of the mines of Bell district.

Cherry Creek District.

LOOKING UP.—White Pine News, June 13: It has been a long time since we have heard of anything that gave us more pleasure than to learn, as we do by the following letter from our old friend, J. B. Williamson, that Cherry Creek is to revive this summer. The old camp has now lain dormant for more than three years, and the hope of the revival of at least some of its old-time prosperity will be welcome news to all our readers. Mr. Williamson says: I have just had a gentleman here to expert on the Exchequer property, and have bonded until the 1st of November the Exchequer group of mines, together with the mill, for a fine figure. The names of the parties are George T. Murdock, of New York, and Robert Chiboon, of Virginia City, Montana. They agree to put men to work on the 1st of July on mine and mill and make things lively for Cherry. Mr. M. Scramlin will take charge of the mill, put it in order and run it. Mr. Murdock will superintend the whole business himself as soon as he returns from California, where he has a gold-mining enterprise. Everybody here feels elated over the prospects for a little business. We have also bonded the Ruby Hill mines, belonging to B. B. Bird and myself, to B. F. Brooks, of Boston, and work has already been commenced on them under the management of R. A. McCormick.

Columbus District.

HOLMES.—Candelaria True Fissure, June 12: In the Murphy ledge we started a stope. This stope is up but a short distance. The ledge is three feet wide and the ore is good, assaying an average of \$60 per ton. This ledge looks very promising. It is situated in a portion of the mine that has never been prospected. In the main 10th we are still drifting east and from the crosscut toward the foot we are raising on a nice bunch of ore. The face of this drift does not show any ore, but it looks very favorable. The ground is hard and progress is slow. In the General Thomas or 11th level we have a good prospect. We are drifting east on a nice streak of ore. This is a good section, has never been prospected, and is east of all work done in this level. The ledge we are drifting on is near the foot-wall of the vein and it looks very encouraging. We are also running a drift from this level to cut the Price stope. The raise from this level is producing some good ore. The sulphuret winze is looking well and producing well. The ore from this ledge is high grade. The hot stope is looking well and has improved in size since last report. The rock around the ore is hard and progress is slow. It is a fine prospect and will give us a large amount of good ore. The stope 60 feet east of last turntable, first shaft level, has also improved very much since last report. We have a raise going up above the stope that is in good ore. The stope 50 feet below first shaft level, and directly under the last-mentioned ore body, looks well and produces well. Mill No. 1 is running half time on Mount Diablo ore. Mill No. 2 is running half time on Holmes ore.

Eureka District.

ORE SHIPMENTS.—Sentinel, June 12: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond Works—Wood-chopper mine, 6 tons; Leonard, 1; Jones, 1; Atlas, 4; Iron Clad, 17; Mohawk, 5; Eureka tunnel, 1; Bullwhacker, 21; White Pine, 1½; Continental, 2; Antelope, 22. To the Eureka Co. Works—Dunderberg mine, 86 tons; Beck, 8; Bay State, 2.

Gold Mountain District.

PROSPECTS.—Candelaria True Fissure, June 12: R. Leisk, a large owner in the Hillside, Trowbridge and Independence mines, in what is known as the old camp, at Gold Mountain, returned from an inspection of his property last evening and left for San Francisco this morning. He brought with him 1000 pounds of ore which he intends having Professor Price experiment on. The ore is known to be rich and the ledges are quite extensive, and if the professor can successfully demonstrate the practicability of any process for the overcoming of its base constituents, Mr. Leisk and his partners will at once resume operations on the mines.

Hawthorne District.

THE NORTH STAR.—Walker Lake Bulletin, June 9: The improvements in the North Star Consolidated are making the managers and owners jubilant. Last week a series of assays were taken which gave an average of over \$125. This is not from a mere seam of ore but from several ledges of good width and extent, as shown by the present developments. A mill in Hawthorne district would be kept busy on ore from the North Star, and it is highly probable that one will soon be put there.

THE PARIGGI.—Tom Pesci is still driving a tunnel on the ledge of the Pariggi in North Canyon. The developments are very encouraging. The ledge is strong and averages \$65 in free gold.

Jefferson District.

CHLORIDERS.—Belmont Courier, June 9: Some good ore is being taken from the mines of Jefferson by the chloriders.

Jungo District.

LOOKING WELL.—Silver State, June 10: D. Le Barron was in town yesterday from Jungo district,

He reports the mines looking well in that camp. The miners McGill and Baldes, who were at work in the Silver Wing mine when J. P. Gensen was caved on and killed, were quite severely injured.

Northumberland District.

CHLORIDING.—Belmont *Courier*, June 9: Some chloriding is still being done in Northumberland district.

Ophir District.

MILL RUNNING.—Belmont *Courier*, June 9: The mill of the Chicago Mining and Reduction Company dropped stamps again on the first day of June. It is hoped that a long and prosperous run of this reducer of silver ores will gladden the hearts of the people of Ophir. The mine is looking well and there is an abundance of good ore in sight.

Palmetto District.

RESUMING WORK.—Candelaria *True Fissure*, June 12: R. B. Catherwood, one of the principal owners in the mining properties at Palmetto and Silver Peak, returned last Tuesday from making a thorough personal inspection of the mines and mill sites. He told a reporter that he was fully satisfied from what he saw that he and his associates would be justified in resuming operations. He at once telegraphed his report to New York and received advice in return authorizing him to go ahead at his discretion, and stating that money had been deposited to meet all demands. He has engaged men and purchased supplies, which will be forwarded at once and the work of cleaning out and repairing the shafts will be begun immediately and the mines put in thorough working order. This will, of course, involve a considerable outlay of money. Mr. Catherwood is pushing the preliminary work as rapidly as possible and will for the present make Candelaria the base of operations. He brought in some unselected samples with him that were taken from the bottom of a 70-foot shaft. They were assayed by the C. W. W. & M. Co. (Limited) and showed \$29 in gold and \$18.10 in silver. These samples were from what they call their low-grade ore body, and there are hundreds of tons of it in sight. In a mill-run from November 27, 1868, to January 20, 1869, the pulp assays went all the way from \$39.95 to \$201.51, but the appliances for saving the metals were so defective that a large percentage was wasted. That, taken in connection with the frightful cost of getting in supplies, necessitated the closing down of the properties. With the improved machinery in use at present and the great reductions in freight, Mr. Catherwood has not the least doubt of the entire future prosperity of Palmetto.

Pioche District.

A RESUMPTION OF WORK.—Pioche *Record*, June 5: The new company now forming, under the management of W. S. Godbe, for the purpose of working mines in Pioche, have titles to the property desired by them perfected. During the week negotiations for the purchase of all the right, title and interest to property owned by the Floral Springs Water Company, also the property owned by the Floral Mining Company, have been going on and consummated. According to a portion of an agreement recorded, all the above property has been turned over to W. S. Godbe, and \$2500 has been paid into the hands of R. H. Elam. The agreement between these parties has been placed in the hands of John Roeder, and when all its provisions are carried out, the money paid, a deed to the property will be given. What this agreement is we were unable to learn, as the parties appear desirous of not having it made public. Neither could we learn the stipend price, but believe it to be in the neighborhood of \$40,000. There are also negotiations going on for the purchase of mining property owned by C. H. Patchen and Mr. Shivers. Should the company succeed in purchasing these last mentioned properties, then this will give them nearly the whole of the north side of Spring mount. We learn that considerable of the stock has already been subscribed, and it is to be hoped that the company will soon commence active operations. Mr. Godbe made the remark that he was confident that he could work the black ledge ore.

Swanger District.

REORGANIZED.—Walker *Lake Bulletin*, June 9: A miners' meeting was held last Saturday near Hutton's Station, and Swanger mining district was reorganized. Some years ago this was a promising district and recently some valuable discoveries have been made which have caused a revival of interest in the old camp.

Tuecarora District.

NORTH BELLE ISLE.—Times-Review, June 11: The cross-cut near the shaft on the 150-foot level has been extended 16 feet.

NAVAJO.—The north drift on east vein from No. 5 cross-cut, 350-foot level, has been extended three feet, and work suspended for the present for want of better ventilation. South drift, east vein, 250-foot level, extended five feet. South drift from Johnson cross-cut, 150-foot level, extended 10 feet. No. 6 upraise on east vein, same level, has been carried up 17 feet. The stopes on 150-foot level are yielding their usual amount and grade of ore. Mill running on company and custom ore.

Tybo District.

STRIKE.—Belmont *Courier*, June 9: John A. Moore brought the news from Tybo that a rich strike had been made in the mine owned by Dimick, Luse & Turin. The ledge is large and carries ore that assays all the way from \$80 to \$200 per ton. Tybo will see a return of prosperous days should it prove anything like as extensive as the Two G.

Ward District.

LOOKING UP.—White Pine *News*, June 7: Ward is looking up. Between 30 and 40 men are now at work there, or waiting for the mill to start up. Czar Giddings has opened a boarding-house, W. R. Bassett the old corner saloon, and a celestial has gone over to open a restaurant. The mill will start up next week.

ARIZONA.

NOTES.—Prescott *Courier*, June 11: The Groom creek mill is crushing Parker gold rock. The Peck mill is ready for another long run. The Del Paso mill is making gold for its owners. Smith & Barnum are working their B. S. B. gold mine in Cherry creek district. It is four feet wide and pays \$20 per ton in free gold. They crush the rock by astrata.

KINGMAN SAMPLING WORKS.—Moberly *Miner*,

June 9: During the month of May these works report having purchased and shipped about 500 tons of ore, for which they have paid out to our miners very nearly \$50,000. This is the largest amount of ore ever run through these works in any one month, and the outlook for the continuance of the ore crop is so good that the proprietor, Mr. Foster S. Dennis, feels justified in purchasing new crushing machinery, for which purpose Mr. Cockburn went to San Francisco last week. When the new crushers are placed in position these works will be able to handle from 75 to 100 tons of ore every day in the week.

COLORADO.

POVERTY GULCH.—Elk *Mr. Pilot*, June 10: A rich strike is reported as having been made in the P. E. Islander a few days ago. An assay from the ore streak which is claimed to be 18 inches wide, by S. C. Robinson, gave 39 ozs. silver, 11 ozs. gold, and 70 per cent lead. The property is located on Cascade mountain, which lies at the mouth of Poverty Gulch, and is owned by Messrs. Brannigan and J. C. Quirrie, both of Crested Butte. We hope the assay shows the average value of the ore and that the pay ore holds its present stated size. We need a boom, and such a strike would give us a big boost in the right direction. James Welton, one of the Domingo mine lessees, was in Gunnison this week. He reports that he has probably 50 or 60 tons of ore on the dump for shipment and about 120 tons in the mine ready to take out as soon as more room can be had on the dump by removing that already out.

IRWIN.—The Bullion King is increasing its force of men. The Forest Queen is loading a car of ore this week for Gunnison, and has a hundred tons of concentrating ore on hand for the Metzger concentrator. The latter, formerly the Rose & Reed mill, is running regularly. Mat Nichols has returned and has charge of the mill. There are a number of promising claims here that might be leased, as the owners will not work them.

LEADVILLE.—Herald-Democrat, June 9: The La Plata smelter is still running only two furnaces. The ore receipts at the American smelter yesterday exceeded 300 tons. The shipment of ore to the Pueblo smelting works from this point is on the increase. The Mercury lease on the Delta is yielding fair gold-bearing ore. The Litter shaft, on Printer Boy Hill, has attained a depth of 450 feet. Mr. Maurice Starne, manager of the Litter property, on Printer Boy Hill, has returned after a short absence East. Mr. Perkins is meeting with gratifying success in the development of the Delta lode, on Printer Boy Hill. The property is producing some fine gold-bearing quartz, and also shows a fair streak of rich silver ore. Manager Kroger, of the Tip Top, after sinking the shaft through 20 feet of mineral, has cut a station, and is now engaged in driving drifts both north and west. The north drift shows ore assaying 35 ounces in silver to the ton, being quite an improvement on the mineral disclosed in the shaft. The north drift is still in sulphide ore, which will doubtless continue until the stopes made by the Forepaugh are reached. Good ore is known to exist there, and a profitable future for the Tip Top is assured beyond a doubt. The Chrysolite mine at present is doing very little. A considerable amount of exploration work is, however, in progress, and new resources may be opened at any time. At present the bulk of the first-class ore shipments are the result of the concentrating works of the company. These contain six jigs, which are kept running on material from the dumps about the Roberts shaft.

MONTANA.

TO START FOUR FURNACES.—Inter-Mountain, June 7: It is learned from reliable authority that to-morrow four furnaces of the Montana Copper Company will be started up under lease. The lessees will have sole management of the works and have contracted to run them principally on high-grade silver ore, which will be mixed with a proportion of copper ore from the Montana Company's mines, thus producing a copper silver matte assaying very high in silver. It is understood that a contract has been concluded with the company for the production of 300 tons of such matte. The run will be somewhat experimental in its nature, and is intended to demonstrate the advantages of working copper and silver ores together. The new enterprise is a most important one, and its result will be awaited with deep interest.

IDAHO.

SNAKE RIVER PLACERS.—Wood River *Times*, June 9: J. S. Hunt, owner of Hunt's placer claims, two and a half miles from Salmon Falls, is in town. He reports the outlook of the Snake river placers far better than it has ever been. In time, Mr. Hunt says, if artesian wells can be sunk in the lava between the railway and the river, millions of dollars' worth of gold will be washed out yearly. Mr. Hunt is operating three Burlap machines, or set of machines, on his claims. He uses from 150 to 200 inches of water per machine, and gets regular returns of \$350 to \$450 per machine per month. He has just added the third machine, and will soon put on a fourth and, possibly, a fifth. He does not believe in letting money stay in the ground, if it can be got out. While Mr. Hunt is satisfied with his yield, his ground is not near as rich as that of the Lucky Bar Placer Mining Company, whose location is about 20 miles from his. The machines at the latter place should yield much more than his, and the only question necessary to consider when trying to ascertain if the Lucky Bar operations will pay, is: Will the machinery raise as much water as it is claimed it will? If it does, or if it raises only half as much, the ground will pay handsomely. But even if it should not pay with machinery, the ground will pay enormously if free water can be got from Clover or some other creek which the company owns. It would, then, only be a question of the cost of putting in a ditch.

THERE'S MILLIONS IN IT.—Coeur d'Alene *Record*, June 9: Through the kindness of W. A. Parker, who has been superintending the work on the Badger claim which has just shut down for want of water, we can give a few facts of general interest. At a cost of about \$1850, some \$600 of which would have contributed to future operations if work had been kept up, gold to the value of \$7698.60 was taken out. This is a profit or net value of a full \$1000 per week.

A strip of 144 feet wide of the channel wash is stripped, and evidences are pretty clearly established that the entire width of the channel is about 250 feet. The depth to bedrock is now 35 feet. We frequently hear the theory advanced that this is an exceptionally rich claim, but Mr. Parker has made several tests and for nearly three years has studiously observed all the developments which have been made along this channel for a distance of nine miles, and he unhesitatingly expresses the opinion that it is not likely that there is a marked variation in the quantity of gold along the entire line. The width and depth of the channel will vary, and the distribution of gold will vary accordingly, and so will the cost of working. Mr. Parker is supported in this opinion by nearly if not every practical experienced miner who has taken pains to study the subject carefully. We have no doubt that as a mining proposition it is reasonably safe to invest money upon this actual knowledge and theoretical conclusions.

NEW MEXICO.

LEAD CARBONATE.—Silver City *Enterprise*, June 12: The Willis mine is shipping to this city for transportation to the Billing smelter at Socorro from three to four carloads of lead carbonate ore a week. Encouraging reports are daily received from the mine, and it is now almost certain that Gustave Billing will take it upon the expiration of his working bond. There is three feet of \$10,000 ore in sight in the Comstock, the great mine of Kingston. The lowest ore found will go over \$800 to the ton, and the average ore shipped goes over \$2600 to the ton. There is now 35 feet of an ore body in sight. Think of that, ye paupers, and gather up your blankets and play private secretary to a burro. Upon the completion of the Huson tramway on the Sheridan mine last week, C. W. Huson, the inventor, made a careful tour of inspection of the mining interests around Cooney, and to some purpose, as he purchased a one-half interest in three prospects, two of which make an excellent showing. They are known as the Oakland and Oakland No. 2, and were located by Eli Mader and Martin Johnson. Development on an extensive scale will shortly begin on a ledge that has already been prospected pretty thoroughly and shows 16 feet of pay ore on the surface.

SOCORRO NOTES.—Socorro *Bullion*, June 12: Wallace, Radcliff & Hadley will soon commence developing their Socorro City lode, situated in Water canyon. The Bonaparte mine, owned by Leddy & McLeish, is working and preparing to ship ore to Socorro for treatment. D. Langsdorf has purchased a half interest in the Quartzite from J. Kelly. It is situated in North canyon, Magdalena, and is showing up first rate. Shands and Leeson are spending the week at their St. Vincent mine, investigating the extent of their late strike of good-grade argentiferous galena. Jim Leeson, our enterprising merchant, is working four men on the St. Vincent, located in the north end of the Magdalenas, and is raising pay dirt. W. Hadley and J. Cowles have a fine-looking property located in the north end of the Magdalenas; the ore assays 47 per cent lead and from 5 to 15 ounces silver.

OREGON.

ALTHOUSE.—Cor. Rogue River *Courier*, June 11: Water drying up fast, and most of us miners are laying plans for the summer's work. Some of us are going to prospect for new fields of operations, the old ground being pretty well worked out. Hansen & Ehman are hard at work cleaning up, with favorable prospects for a good return for their winter's labor. James Turnhull has struck some good-paying gravel in his tunnel, after a year's bard driving through bedrock. Kline & Thompson are still working their old claim in the left-hand fork. Joseph Trimby has, I am told, sold out his claim to a China company for \$3000. All the miners on the upper waters of the creek are busy cleaning up, but I have not been advised as to the results. German, of Walker Gulch, has struck some new diggings on the upper waters, and is taking out some very pretty gold. Doyle & Crosby, of California Bar, Sucker Creek, have got their claim in first-rate condition for a long summer's work. The old man has just returned from a prospecting trip through Josephine and Canyon creeks. He found that there was some new ground being opened on the south fork of Canyon creek; also that there is some excitement about the mines on Chitico and its tributaries. Stewart & Co. are on one of the southern prongs, and have struck a fair prospect. They have built for themselves a cabin and got out lumber for sluices, and will be all ready to commence washing this week. John Hale, with a company of three others, will soon go over and commence operations at the same point. This gulch lies in the Coast Range, and about 24 miles southwesterly of Kerby. The trail runs up Canyon creek to Lightning gulch, and crosses the mountain down to the waters of Chitico. I was told that some coarse gold had been found in the Tin-Cup creek. This is another tributary of the Chitico river, but lies much farther west and is situated in a much rougher country.

UTAH.

PARK NOTES.—Park *Record*, June 12: The Marsac mill will ship to-day seven bars of bullion, containing 678.1 fine ounces of silver, as this week's output. The Mackintosh sampler received from the 5th to the 11th, inclusive, the following lots of ore: Ontario, 622,300 pounds; Daly, 236,280 pounds; and Woodside, 15,650 pounds. The Crescent shipped during the week 161,324 pounds of concentrates and 130,000 pounds of first-class ore. There is nothing new to report from the Apex. It is understood, however, that an increased force of miners will be put to work on the property soon. The Woodside mine is idle for the present. Negotiations to lease the property are now pending. A report to the effect that work is to be resumed on the Parleys Park on a large scale lacks satisfactory confirmation. Prospects at the Jupiter mine are bright. The mine is economically worked by a system of tunnels, and by the latter part of this month high-grade ore will be shipped in paying quantities to the sampler. The force now numbers six men and will be increased in about a month. Thursday was the Crescent Company's pay-day. The Southern Tier group of mines is being worked by seven men under the management of F. W. Hayt. Ore shipments will be resumed in about two weeks.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING JUNE 8, 1886.

343,265.—EASY CHAIR AND SOFA BEDSTEAD—W. F. Bean, S. F.
343,220.—VERMIN EXTERMINATOR—F. E. Brown, Los Angeles, Cal.
343,434.—CAR COUPLING—J. C. Clay, Wells, Nevada.
343,364.—GRAIN SEPARATOR—B. D. Crocker, Walla Walla, W. T.
343,441.—ROTARY ENGINE—J. H. Darragh, S. F.
343,268.—ROCK CRUSHER—H. J. Dykes, S. F.
343,241.—WET ORE CONCENTRATOR—Jos. Hubert, S. F.
343,382.—GATE—W. Mason, Puyallup, W. T.
343,395.—PARLOR FIRE-PROOF SAFE—John Peterson, S. F.
343,283.—STOP-COCK—Wm. Swabel, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Mining Share Market.

Mining stocks have not been at all active for the past week. The temporary closing down of two of the prominent Constock mines, on account of breakage of machinery, is the only event of importance from that section of country. The *Enterprise* states quite an improvement has been developed in the ore prospects of the Savage mine, on the 600 level, running south from the Gould and Curry, some very fine-looking streaks and bunches of good ore coming in. There is plenty of room for quite a bonanza to form at that point, and the management feel quite elated over the prospect. Other than this, there are no new features of interest to record in Constock ore development. The sinking of the Chollar-Norcross-Savage or Combination shaft makes excellent progress, being now in vein matter easily excavated. This shaft is now 3234 feet in perpendicular depth. The diamond drill operations on the 3100 of Potosi have made no decisive advancement worth mentioning during the week. A diamond drill hole is started from the face of the 2900 level lateral drift of Hale and Norcross toward Savage, in order to feel ahead as a precaution against any possible extra flow of water. The lateral drift south on the 3200 level from the deep winze is making good progress toward connection with the Combination shaft. The ore developments and indications on the 600 level are very encouraging and bid fair to lead to something important. The new work in Gould and Curry also promises well, and the low-grade bonanzas in Consolidated-California-Virginia and the Gold Hill section still continue their extensive regular yield in quantity, but at the north end the quality has rather deteriorated of late.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Argus, June 10, \$17,860; Germania, 8, \$6377; Hanauer, 8, \$8575; Stormont, 8, \$2395; Queen of the Hills, 8, \$1100; Alice, 9, \$17,763; Hanauer, 9, \$2900; Germania, 10, \$1850; Hanauer, 10, \$5975; Pascoe, 10, \$1800; Queen of the Hills, 11, \$1200; Hanauer, 11, \$5980; Queen of the Hills, 12, \$1155; Germania, 13, \$5582; Hanauer, 13, \$8950; Queen of the Hills, 12, \$1300; Odessa mill, 12, \$13,600; Oldberg & Thede, \$13,300; Oro Grande mill, 12, \$8060; Monitor, 12, \$5000; Dexter, 12, \$18,400; Old Lexington, 12, \$3200. The Salt Lake metal and ore shipments for the week ending June 10th were as follows: 35 cars bullion, 858,498 pounds; 32 cars ore, 737,212 pounds; 5 cars copper ore, 150,300 pounds; — cars sulphur, 51,000 pounds; a total of 74 cars and 1,797,016 pounds. Wells, Fargo & Co. received \$78,450; McCormick & Co., \$73,875; I. R. Jones & Co., \$33,363; and Union National Bank, \$31,520.

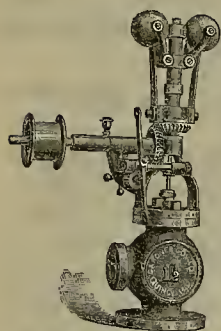
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E. L. RICHARDS—San Diego Co.
R. G. HUSTON—Idaho and Montana.
GEO. McDOWELL—Santa Clara and Santa Cruz Co's
J. B. PITCH, Nevada and Utah.
M. S. PRIME—Shasta Co.
FRANK W. SMITH—Oregon and Wash. Ter.
A. CALDERWOOD—Napa Co.

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Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.



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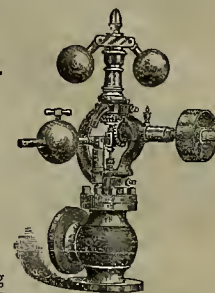
91 to 93 FRONT STREET, PORTLAND, OR.

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The Mundy Patent has been sustained in the United States District Court of New York against the Ledgerwood Manufacturing Company, and also in the District Court in the State of New Jersey against Kendall & Roberts for infringement. Therefore all parties are cautioned against making, using, or selling Friction Drums that infringe this patent.



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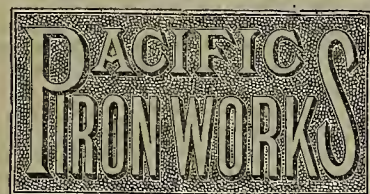
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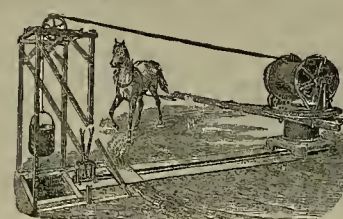
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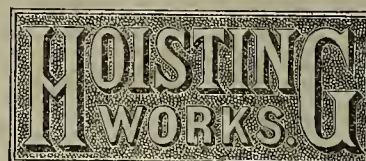
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



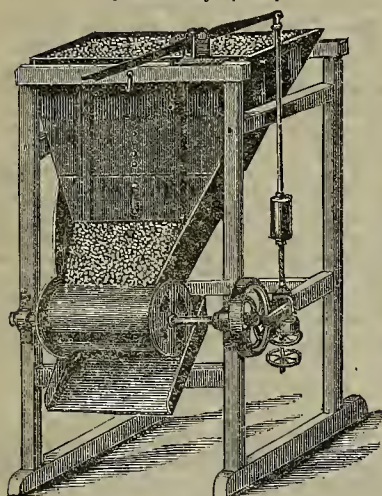
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Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 600 feet of five-eighths steel rope. SEND FOR CIRCULAR.



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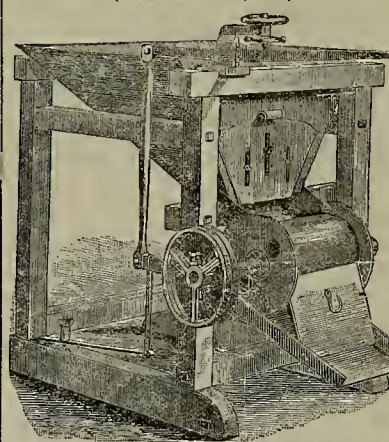
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Correspondence Solicited.

MINES WANTED.

Mines of every description wanted. State locality, means of access, character of ore, width of vein, amount of work done, wood and water facilities, etc. Silence of eight days a negative. Address Box 265 (B.), San Francisco.

THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
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A Good Opportunity for a Mechanist.

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic. Address A. B. O., care of this paper.

STURTEVANT MILL.

This Mill as a Crusher and Pulverizer is without rival.
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

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MACHINERY,

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FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

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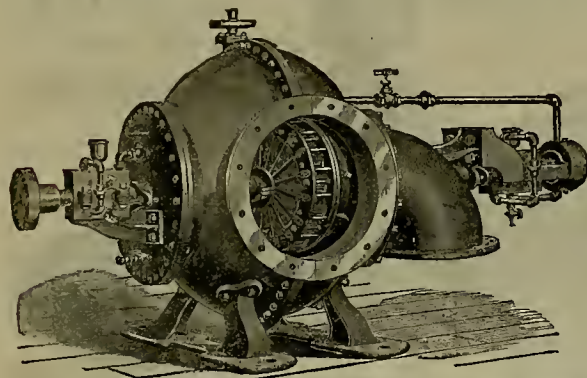
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JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.
Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers,

JAMES LEFFEL & CO.,

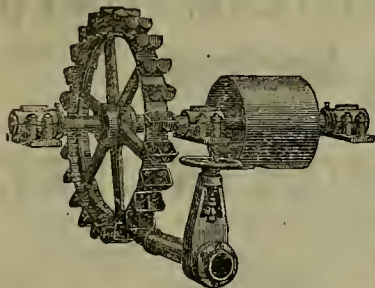
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Or 110 Liberty St., New York

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PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

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THE HARTSFELD Portable Smelting Furnace Co. OF NEWPORT, KY., U. S. A.

Desires to send free full illustration and price list of their latest improved patents of Smelting and Mining Machinery adapted for the economical treatment of all low-grade ores in Europe and the U. S. of A. The Canada patent rights for sale on shares, royalty or otherwise. Address as above.



Dewey & Co. { 252 Market St. } Patent Ag'ts

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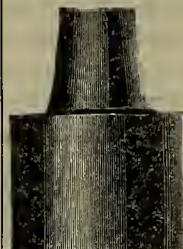
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BLACKSMITH HAND BLOWERS.
GUARANTEED

The Lightest Running! The Strongest Blast!
The Most Durable!

ADAPTED TO ALL KINDS OF WORK,
Send for Catalogue! AND MADE IN STYLES AND SIZES TO SUIT.

THE FOOS MANUFACTURING CO., - - Springfield, Ohio

ADAMANTINE Shoes, Dies and Crusher Plates



ADAMANTINE.

We manufacture the above Adamantine Shoes, Dies and Crusher Plates. They are in use on the hardest quartz in the United States and South and Central America, and have been for the last ten years; we warrant them to outwear three (3) sets made of any other metal, and many report that they last from 4 to 8 times longer than any other make. They never break AT THE SHANK, and the wear is so light that little or no foreign matter gets mixed with the crushed ore.

Also CHROME CAST STEEL for Mining and General Use, of the finest quality.

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When ordering, a rough sketch, with full dimensions, is all that is necessary.

CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

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IRON CASTINGS OF ALL DESCRIPTIONS.

Metallurgy and Ores.

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GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

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ALSO MANUFACTURERS OF

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Under Chamberlin Patent.

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Corner of Leldesdorf Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.
Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.
Practical Instruction given in Treating Ores by improved processes.

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Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

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JOHN TAYLOR & CO.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED 1869.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

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ASSAY OFFICE,

CHEMICAL

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San Francisco.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co.	Nevada.	29.	25. May 28. July 2.	July 22. B. Burris.	329 Montgomery St
Bentmont M Co.	Nevada.	40.	10. Apr 30. June 5.	June 23. J. W. Pew.	310 Pine St
Baker & DeWitt M Co.	California.	11.	25. May 3. June 7.	June 28. D. M. Kent.	330 Pine St
Belle Isle M Co.	Nevada.	9.	10. May 5. June 9.	July 1. J. W. Pew.	310 Pine St
Bodie Tunnel & M Co.	California.	13.	25. May 28. July 5.	July 26. C. Harvey.	309 California St
Best & Belcher M Co.	Nevada.	34.	20. May 25. July 21.	Aug 9. W. Willis.	309 Montgomery St
Crocker M Co.	Arizona.	3.	20. May 25. July 6.	July 28. A. Waterman.	309 Montgomery St
Chollar M Co.	Nevada.	20.	10. May 21. June 24.	July 15. C. E. Elliott.	309 Montgomery St
Eureka Con M Co.	Nevada.	9.	1.00. Apr 20. May 31.	June 22. E. H. Willson.	328 Montgomery St
Golden Placer M Co.	California.	5.	20. Apr 25. July 15.	Aug 2. W. J. Gasson.	Pine Block
Hale & Norcross M Co.	Nevada.	90.	50. May 12. June 14.	July 7. F. Lightner.	309 Montgomery St
Justice M Co.	Nevada.	44.	10. May 12. June 16.	July 6. R. E. Kelly.	419 California St
Live Oak Drift M Co.	California.	1.	25. May 25. June 30.	July 22. T. Wetzel.	522 Montgomery St
Lucky Hill Con M Co.	Nevada.	3.	05. Apr 5. June 7.	July 7. F. D. Black.	27 Ellis St
Maxwell Gravel M Co.	California.	30.	25. Apr 30. June 6.	June 25. J. Mortiz.	309 Montgomery St
Mount Rose M Co.	Nevada.	4.	11. May 13. June 17.	July 8. J. Coddington.	309 Montgomery St
North Peer M Co.	Arizona.	3.	02. May 19. June 24.	July 19. H. Deas.	309 Montgomery St
Ophir S M Co.	Nevada.	51.	25. June 7. July 13.	Aug 2. E. B. Holmes.	339 Montgomery St
Peerless M Co.	Arizona.	1.	50. May 12. June 22.	July 16. A. Waterman.	309 Montgomery St
Palomas Placer M Co.	California.	1.	12. June 1. July 5.	July 19. D. Buck.	309 Montgomery St
Sierra Nevada S M Co.	Nevada.	55.	25. May 27. July 1.	July 20. D. L. Parker.	309 Montgomery St
Silver Hill M Co.	Nevada.	23.	10. Apr 21. May 27.	June 16. W. E. Dean.	309 Montgomery St
Union Con M Co.	Nevada.	33.	25. Apr 19. May 26.	June 22. J. M. Buffington.	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Almont M Co.	Nevada.	T. Harman.	330 Pine St.	Annual.	June 26
Alpha Con M Co.	Nevada.	W. Willis.	309 Montgomery St.	Annual.	June 21
Bodie Con M Co.	California.	G. W. Sessions.	309 Montgomery St.	Annual.	June 21
North Peer M Co.	Nevada.	J. W. Pew.	310 Pine St.	Annual.	June 22
Union Con M Co.	Nevada.	J. M. Buffington.	309 California St.	Annual.	July 19

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Caledonia M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Feb 23
Oon Virginia & California M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	30.	Feb 12
Derbec Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Feb 9
Holmes M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Mar 20
Monie M Co.	California.	G. W. Sessions.	359 Montgomery St.	25.	Mar 10
Manhattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Feb 17
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar 15
Young America M Co.	California.			40.	Apr 20

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 27.	WEEK ENDING June 3.	WEEK ENDING June 10.	WEEK ENDING June 17.
Alpha.	40.85	40.85	40.85	40.85
Alta.	40.50	40.50	40.50	40.50
Andes.	40.50	40.50	40.50	40.50
Argenta.	1.10	1.10	1.10	1.10
Belcher.	1.10	1.10	1.10	1.10
Best & Belcher.	1.00	1.10	1.00	1.00
Bullion.	45.30	45.30	45.30	45.30
Bonanza King.	1.10	1.10	1.10	1.10
Belle Isle.	1.05	1.05	1.05	1.05
Bodie Con.	1.65	1.80	1.35	1.60
Benton.	05.10	05.10	05.10	05.10
Bodie Tunnel.	1.70	2.10	1.75	1.70
Bulwer.	1.70	2.10	1.75	1.70
California.	1.40	1.50	1.40	1.40
Challenge.	25.40	25.40	25.40	25.40
Champion.	60.70	60.70	60.70	60.70
Chollar.	1.90	3.10	2.00	2.00
Confidence.	1.10	1.10	1.10	1.10
Con. Imperial.	1.40	1.50	1.40	1.40
Con. Virginia.	1.40	1.50	1.40	1.40
Oon. Pacific.	40.45	40.45	40.45	40.45
Orown Point.	95.30	95.30	95.30	95.30
Day.	2.10	2.25	2.20	2.20
Eureka Con.	2.10	2.25	2.20	2.20
Eureka Tunnel.	1.15	1.15	1.15	1.15
Exchequer.	1.15	1.15	1.15	1.15
Grand Prize.	1.00	1.15	1.00	1.00
Gould & Curry.	2.00	2.45	1.80	2.00
Goodshaw.	40.60	40.60	40.60	40.60
Hale & Norcross.	2.00	2.45	1.80	2.00
Holmes.	2.25	2.50	2.25	2.50
Independence.	1.10	1.10	1.10	1.10
Julia.	1.10	1.10	1.10	1.10
Justice.	1.10	1.10	1.10	1.10
Martin White.	2.45	2.60	2.50	2.50
Mono.	40.55	40.55	40.55	40.55
Mexican.	2.30	3.10	3.10	3.10
Mt. Diablo.	65.85	65.85	65.85	65.85
Northern Belle.	50.70	50.70	50.70	50.70
North Belle Isle.	50.70	50.70	50.70	50.70
Ophir.	50.70	50.70	50.70	50.70
Overman.	60.70	60.70	60.70	60.70
Potosi.	1.00	1.15	1.00	1.00
Practical Con.	1.00	1.15	1.00	1.00
Seg. Belcher.	45.70	45.70	45.70	45.70
Sierra Nevada.	15.80	15.80	15.80	15.80
Silver Hill.	8.00	8.00	8.00	8.00
Silver King.	30.75	30.75	30.75	30.75
Sorobon.	30.75	30.75	30.75	30.75
Syndicate.	15.80	15.80	15.80	15.80
Tioga.	45.70	45.70	45.70	45.70
Union Con.	15.80	15.80	15.80	15.80
Utah.	90.100	90.100	90.100	90.100
Yellow Jacket.	2.70	2.70	2.70	2.70

Sales at San Francisco Stock Exchange.

THURSDAY A. M., June 17.	100 Mexican.....	35c
30 Alpha.....	250 Mono.....	2.10
50 B. & Belcher.....	150 NavaJo.....	80c
100 Bodie Con.....	1.85 @ 70.....	950
40 Bulwer.....	40 @ 45.....	50 Sierra Nevada.....
150 Chollar.....	40 @ 45.....	40c
100 Con Va & Cal.....	1.20.....	100 Tioga.....
500 Gould & Curry.....	80c.....	100 Utan.....
300 Hale & Nor.....	2.15.....	200 Union Con.....
100 Holmes.....	2.70.....	100 Yellow Jacket.....
		85c

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, June 17, 1886.

ANTIMONY—French Star.	91 @	8
BORAX—San Bernardino.	— @	62
ARMAGOSA.	— @	62
IRON—Gleugarnock ton.	22 50 @	—
Eglinton, ton.	22 50 @	—
American Soft, ton.	23 00 @	24 50
Oregon Pig, ton.	21 00 @	22 00
Chippier Gap, No. 1 & 4.	22 00 @	23 50
Clay Lane White.	22 50 @	—
Shotts, No. 1.	23 50 @	—
Steel—English, lb.	16 @	25
Black Diamond, ordinary size.	10 @	—
Flow.	4 @	6
Machinery.	5 @	6
Sanderson Bros.	10 @	—
COPPER—	—	—
Braziers' sizes.	19 @	—
Fire-hos sheets.	20 @	—
Bolt.	19 @	—
Sheathing.	12 @	—
INCO.	12 @	13
LEAD—Pig.	4 75 @	5 00
Bar.	4 75 @	5 00
Pipe.	7 @	—
Shot, discount 10% on 500 bag.	1 85 @	—
Buck, 3/4 bag.	2 05 @	—
Chilled do.	2 25 @	—
ZINC—German.	9 @	10
Sheet, 7x3 ft. 7 to 10 lb. less the case.	7 @	—
QUICKSILVER—By the flask.	35 00 @	36 00
Flask, new.	1 05 @	—
Flask, old.	85 @	—
TINPLATE—Coke.	5 30 @	5 50
Charcoal.	6 15 @	6 25

SAVED my eyes by using Muller's pebbles, 135 Montgomery St., near Bush. x

MINING AND SCIENTIFIC PRESS.

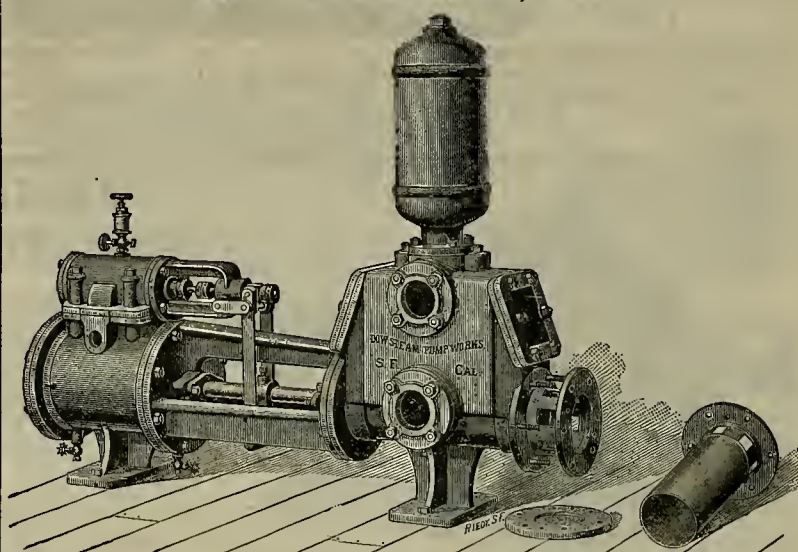
JOHN A. ROEBLING'S SONS CO. WIRE ROPE

GALVANIZED SHIP RIGGING, MINING, TILLER, ELEVATOR, TINNED, & COPPER ROPE, SASH CORDS. LARGEST WIRE ROPE WORKS IN THE WORLD.

IRON & STEEL WIRE OF EVERY KIND.

TELEGRAPH WIRE, HARD & SOFT COPPER WIRE INSULATED FOR ELECTRIC USE. SWEDISH IRON WIRE, CRUCIBLE STEEL WIRE. TRENTON, N.J. & 14 DRUMM ST. SAN FRANCISCO, CAL.

DOW STEAM PUMP WORKS, San Francisco, Cal.



DOW'S IMPROVED STEAM PUMPS And Pumping Machinery

FOR EVERY POSSIBLE DUTY.

COMPOUND PUMPING ENGINES,

Condensing and Non-Condensing,

.....FOR.....

Water-works, Mining Purposes, Irrigation, Etc.

GRAND SILVER MEDAL Awarded at Mechanics' Institute Industrial Exhibition for Best Direct and Double-acting Pump.

Works: 114 & 116 Beale St. Correspondence solicited. Call or send for Catalogue.

CALIFORNIA

ARTIFICIAL STONE PAVING CO.

(SCHILLINGER'S PATENT.)

—FOR—

SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.

The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is hocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

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EGBERT JUDSON, President. ALBERT H. REICHLING, Secretary. O. COODMAN, Manager

SQUARE FLAX PAVING.

Finest Packing in the world. Trial Sample sent free. Send for circular. Beet of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.

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LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

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THE FIFTEENTH YEAR WILL BEGIN

Wednesday, July 28, 1886

American Exchange Hotel,

SANSOME STREET,

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50

PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

Dewey & Co. { 252 Market St. } Patent Ag'ts

New York Metal Market.

Telegraphic advices dated June 17th give the following New York prices:

BORAX—6½¢ @ 7¼¢.
BAR SILVER—98½¢ per oz.
COPPER-LAKE—\$10.12½ @ 10.25.
IRON—No. 1, \$17 @ 18.50; No. 2, \$15 @ 16.50.
LEAD—\$4.85 @ 4.95.
QUICKSILVER—43 @ 43½¢ @ 44¢ lb.

The following is the latest from the "New York Metal Market Report":

COPPER—Quiet, but fairly steady; Lake offered at 9.95 @ 10.15¢. Transferable Notices (Lake) offered at 10.00; Transferable Notices (Chili Bars) offered at 9.39 15¢.

LEAD—Strong at 4.80 @ 4.90¢. Transferable Notices (Domestic) issued at 4.80.

SPELTER—Easier at 4.40 @ 4.60¢. Transferable Notices (Domestic) issued at 4.57½¢.

TIN—Lifeless. Transferable Notices issued at 22.05¢.

TIN PLATE—Dull. Transferable Notices issued at 4.25¢.

IRON CERTIFICATES—Dull at \$15½ @ \$17. Transferable notices (June delivery) issued at \$16½.

SILVER—New York, 98½¢ per oz. London, 45d.

MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00. Hudson River, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge \$15.00 @ 16.00. Southern, Grade No. 1, \$18.00 @ 18.50; No. 2, \$17 @ 17.50; Grey Forge \$15 @ 16.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, June 11th, \$22.50 @ 22.60; Billiton Tin, \$22.65 @ 22.80; Banca Tin, \$22.80 @ 22.95; Baltimore Copper, \$9.75 @ 10.00; Orford Copper, \$9.75 @ 10.00; P. S. C. Copper, \$9.75 @ 10.10; Foreign Lead, \$4.95 @ 5.00; Foreign Spelter, \$4.75 @ 4.90.

MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

....MANUFACTURER OF....

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

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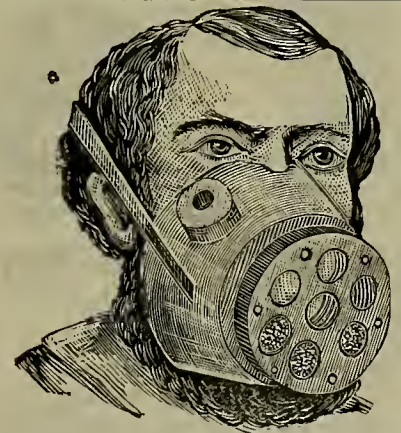
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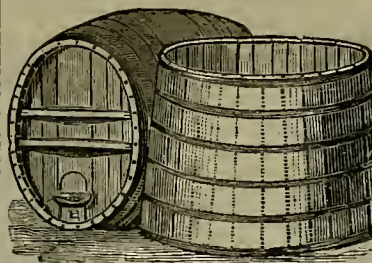
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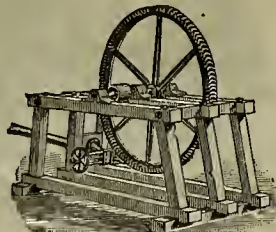
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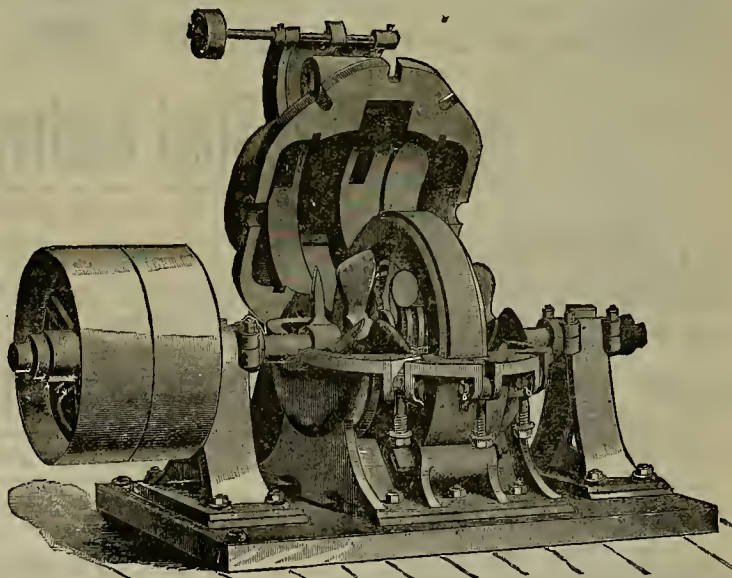
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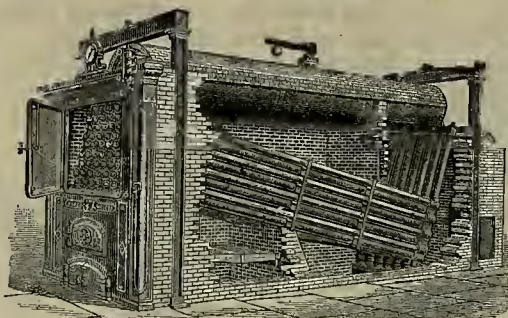
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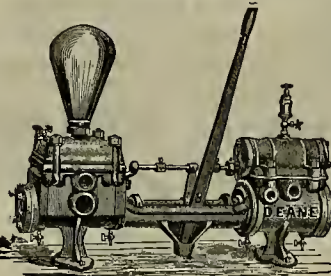
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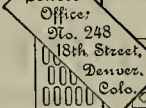
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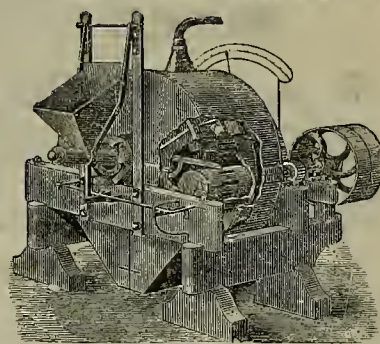
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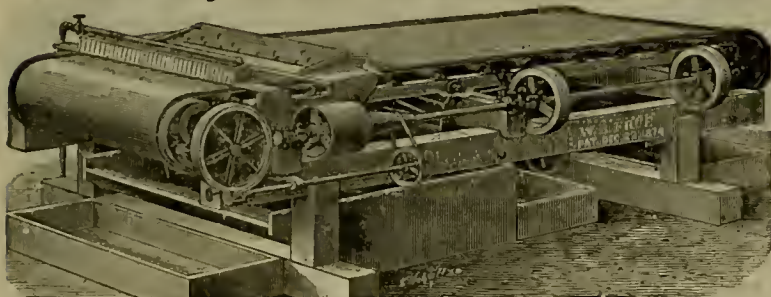
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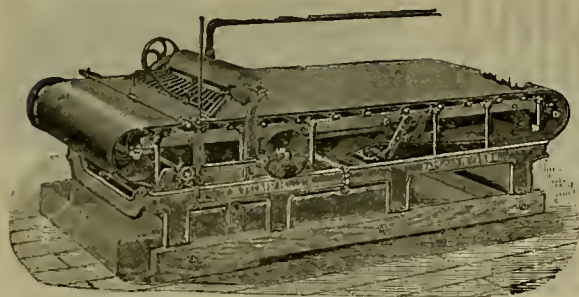
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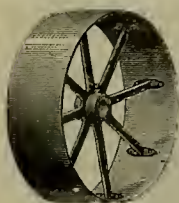
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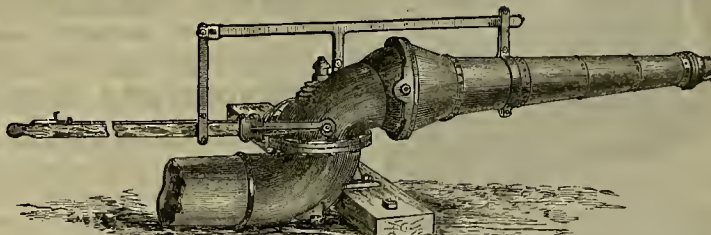


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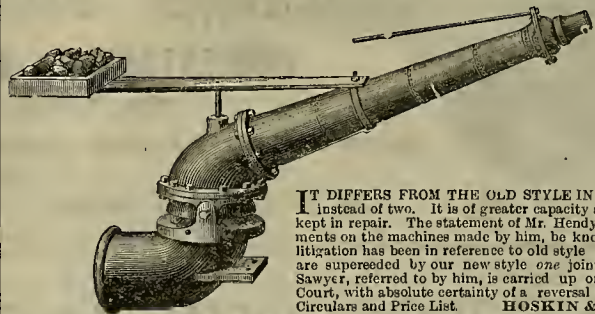
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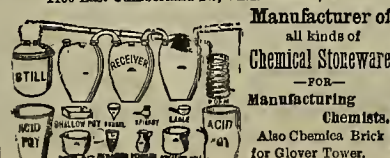


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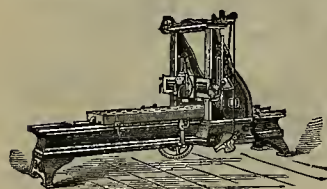
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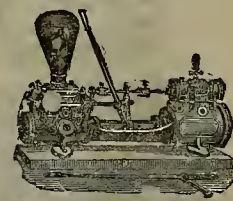
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complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating
looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.**F. A. HUNTINGTON,**

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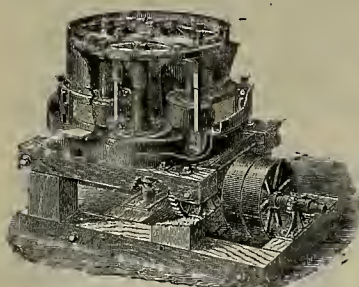
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Mining Machinery of Every Description,

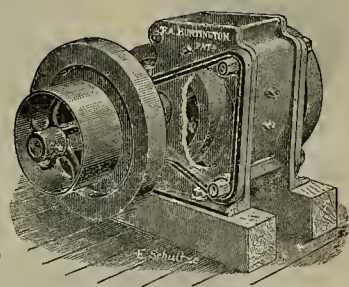
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, JUNE 26, 1886.

VOLUME LII.
Number 26.

New Emery-wheel and Tooth Grinders.

We illustrate on this page two new tool grinders built by the Springfield Glue and Emery-wheel Co., of Springfield, Mass. Large emery-wheels, made especially water-proof, are used and arranged for grinding on the front side of the wheel, or on both the front and back sides, thus enabling front or back grinding, as may be desired. The machines take up little

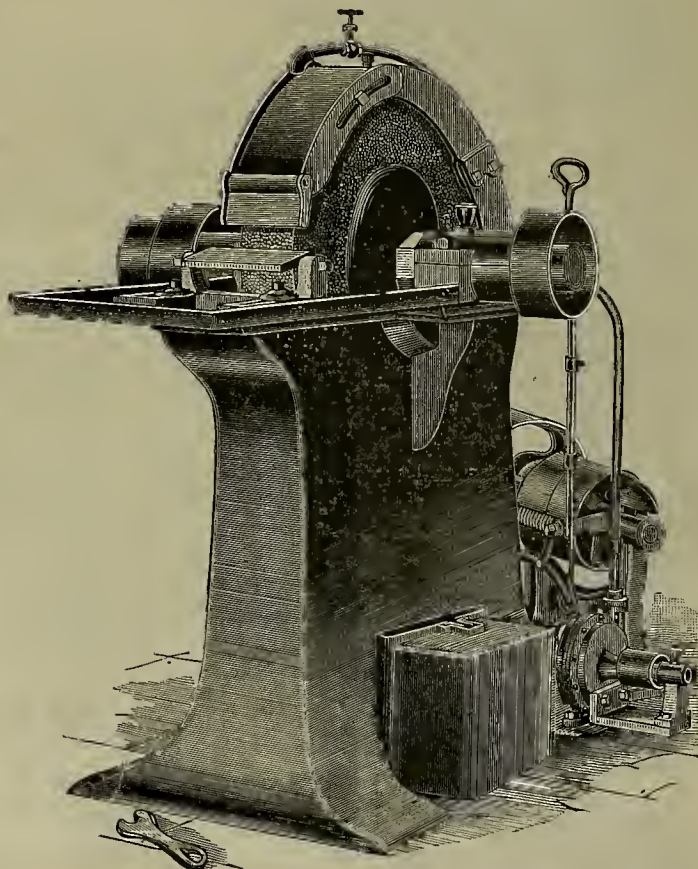
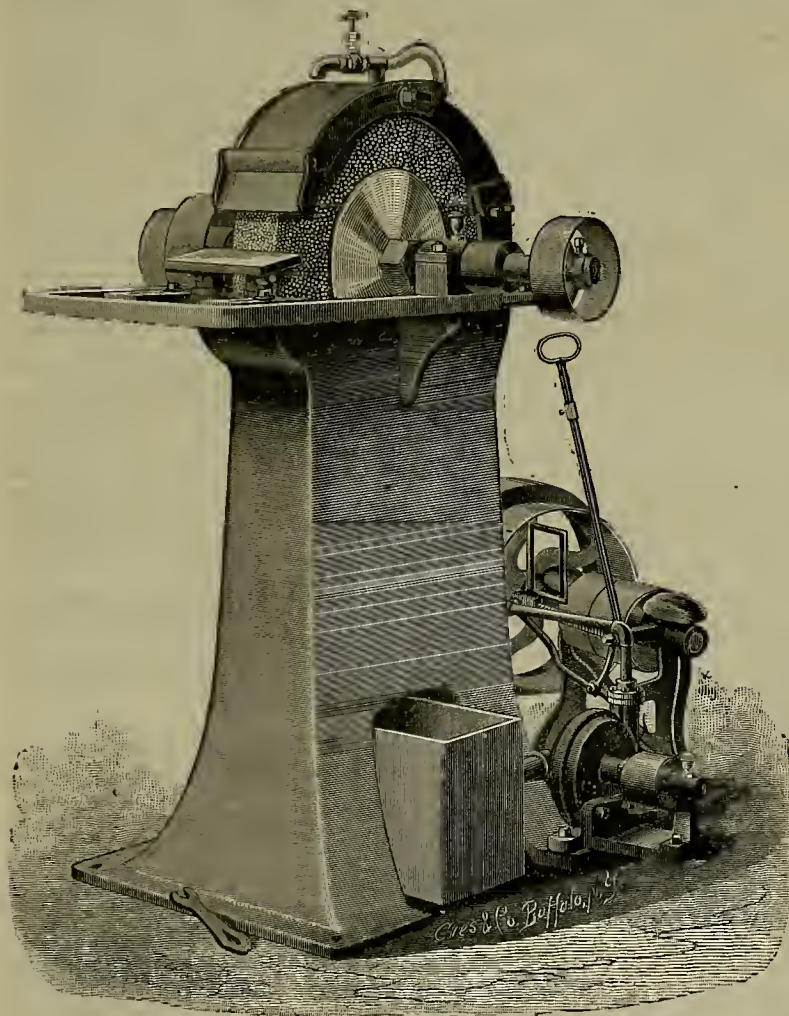
minute of harder and sharper cutting grit. A machinist averages perhaps half an hour daily at a grindstone, and in a shop of 20 men 10 hours per day are consumed sharpening tools, which at 20 cents per hour amounts to about \$600 per year. This emery-wheel tool grinder, it is claimed, will do the same work in less than half the time, at a saving of over \$300 per year—more than enough to pay for the machine the first year, even if the grindstones cost

wheel is controlled by a valve to the desired amount. Four sizes of each style are manufactured, each using steel spindles from 1½ to 2½ inches in diameter, with frame proportioned to the size of emery-wheel used, as follows: 30x4 inches, 26x4 inches, 20x3 inches and 14x 2½ inches.

The same firm making these tools also manufacture a new automatic knife grinding machine, which is something superior to the

Gravel Mills.

Cement gravel, if rich enough, and sometimes gravel which is quite loose, is crushed in stamp mills of the same character as those used for quartz, but fitted with very coarse screens. In one water-power 20-stamp mill in this State crushing this gravel the stamps weigh 450 pounds each, and drop 90 times per minute with an 8-inch fall. Thirty miner's inches of



NEW EMERY-WHEEL TOOL GRINDERS OF THE SPRINGFIELD GLUE AND EMERY-WHEEL COMPANY.

room and are claimed to make less dirt than ordinary grindstones, and the workmen stand nearer the wheel, enabling them to more closely watch the work. The grade or coarseness of grit and any degree of hardness can be regulated and adapted to the kind of work to be done. The emery-wheel is made of emery and corundum, crushed down from large pieces by improved machinery to give each grain the most possible cutting corners. The particles composing the emery-wheel are sharp cut, and, being five or six times harder than those of an ordinary grindstone, are claimed to do so much more work. Thus a grindstone three feet in diameter, making 70 revolutions, gives 660 feet per minute of grinding surface, while an emery-wheel two feet in diameter can safely make 550 revolutions, and thus give 3460 feet, or over five times the grinding surface per

nothing. The emery-wheel in this machine is surrounded by a hood, except where the grinding is done, which prevents the water flying off, even at high speed, and is adjustable to the wheel as it wears away. The front section is provided with a pocket, with holes through it, to distribute the water over the face of the wheel as it leaves the pipe. This pocket being open, is easily cleaned of any dust or rust that gathers in the holes. An iron tank is placed under the wheel to receive the water coming from it, and to catch the waste ground off. The latter settles to the bottom out of the way, and can be easily carried away from time to time. This is an important feature. A second tank is placed by the side of this as an overflow tank, to which a centrifugal pump is connected by a pipe. The water is comparatively clean and is used over and over. The flow on the

general run of such machines. They are also makers of a fine grade of emery-wheels. Both machines and emery-wheels are carried in stock by the Stearns Manufacturing Company in this city, their Pacific Coast agents.

The big dredge working on the Potomac flats, near Washington, the machinery for which was built in this city on the same pattern as the Von Schmidt dredge at work on Oakland harbor, was burned last week, and seven men lost their lives.

A deposit of blood agate resembling Scotch blood stone has recently been discovered on Grand river, near Cisco, Utah. It covers a territory three miles square. The stones are large enough to saw into slabs for mantels and table-tops.

water, under a head of 130 feet, furnish the motive power. Of the total amount of gold saved, 80 per cent is caught in the battery. Outside of the mortar the pulp flows over silvered plates and thence through 800 feet of sluices.

In another mill in this State there are 10 stamps of 850 pounds each, dropping 90 times per minute with a 10-inch fall. There the coarser gravel and howlders are not crushed, but only the finer and softer gravel. The screens are sheet iron with 3-16th inch round holes. From 60 to 70 per cent of the gold sand is caught in the battery, with 20 to 25 per cent on the aprons. In a seven-months' continuous run the following results were achieved: Carloads of gravel crushed, 4241; total yield, \$44,835; average yield per carload, \$10.57; average yield per ton, \$7.05; average cost per carload of mining and milling, \$3.94.

The Vekol.

A Rich Mine and Model Camp.

Who has not heard of this now famous Vekol mine, and the fortune it has brought to its deservingly and enterprising owners? The Silver King has enjoyed for many years the reputation which its name signifies, and it has fully merited the designation. But even kings are supposed to be but the gifts of their mothers, and more remotely of their grandmothers. Without detracting a single silver thread from the crowning glory of the King, both in name and in its intrinsic value, the Vekol is the grandmother mine. The word is the Papago expression for grandmother, and the mine takes its name from the Indian trail of that name, which passes through the saddle-like pass of the mountain of the Bitter Well range, in which the mine is located. The hither well is in the Vekol basin, a natural opening about two miles wide by four or five miles long, surrounded on all sides by hills. The well is in its center, and was excavated earlier than Papago traditional history treats. No one knows its origin. It was in existence as long as the oldest of the present generation of Indians can remember. It is about 30 feet deep, the last 10 feet being through rock. Its top is about 50 feet wide and a path leads down its sides to the bottom. The water was quite brackish, and, since other wells were sunk into the basin, it has all disappeared. The other wells have pure and clear water, with the exception of one—a salt well, showing by analysis 500 grains of chloride of sodium to each gallon of water. The water is invariably found at a depth of 30 feet, below which no water supply has been found. Attempts have been made, and tubes sunk from 30 to 90 feet below the present water level have revealed no indications of water. The wells from which the water is pumped to the mine and mill are about a mile and a half to the northeast of the mine, in Vekol basin, and are nearly 500 feet below the level of the mill. Attempts were made to find water at a still lower altitude, and three wells were sunk at depths of 135, 218 and 160 feet respectively, but no water was found. The pitch of the stratification where water was looked for was followed without success. This water supply is not large, and only yields enough to keep the mill running six days in the week. Other wells are being dug with hope of securing more water.

The Mine.

The Vekol mine was discovered in January, 1880, and was located the following month. It was originally found by an old Papago Indian who had been working at farming with Mr. J. D. Walker. Another Indian had, fully five years previously, shown Mr. Walker from a distance where the mine was, but it was considered of little value and no attention was given to it. The second Papago brought some of the ore and was told that it was valuable and that he had better locate it. Several days afterward he returned and wanted Mr. Walker to locate it with him, as he was afraid the other Indians might cheat him. Mr. Walker made out the location notice from the description given and sent it out by the Papago to put up, and he followed a few days later, accompanied by Mr. Merritt. They dug on the ore and during the first day they took out everything in sight, about 200 pounds, which netted \$59. It really looked as though the ore was all taken out, but Mr. Walker thought he would further prospect it, and four or five months later he took a couple of Mexicans with him and succeeded in finding a little ore here and there until enough was secured to make a shipment to San Francisco, which brought back a return of \$130 to the ton. Since that time the work has been kept up almost continuously, the first-class ore being shipped and upon which about \$250,000 was realized, and the second grade ore was piled up on the dump until the 10-stamp mill was started up 10 months ago, since which time it has been constantly in operation.

Curious Features.

The formation is limestone and talc, in which the ore seems to be threaded rather than in a regular vein. It is not continuous for any great length, but is broken with the formation. It was found on an exposed face of the rock from which the barren croppings had apparently at some remote period broken away, and for a distance of nearly 500 feet up the face of the hill the gangue can be traced to the croppings which hide the treasure from all other view. The ore bodies generally run north and south. The ore is in bunches or pockets, sometimes several feet wide and again nothing but a mere discolored thread or seam for an indefinite distance, suddenly enlarging again into a pocket. Some of these pinched-out seams continue for 20 or 30 feet before a new body of ore is encountered, but one is sure to be found if the seam is followed. This irregular diffusion of the rich ore precludes the possibility of working the mine in that systematic manner which the thorough and experienced miners from the Comstock regard as the only proper way of mining. The ore seams radiate in irregular directions and the ore can be mined only by following them, or "coyoting," as the process is appropriately termed, and so long as this method produces the requisite hullion return and extracts all the pay ore to be found, it is perhaps as good a method as the regular plan, and in fact is the only system by which this peculiar mine can be

worked at a profit at all. There has been run in tunnels and shafts, in this way, from 5000 to 6000 feet in the aggregate, and from the nature of the works not a single stick of timber has been found necessary throughout the entire workings. Notwithstanding the apparent disadvantage of following such "streaks of rust," as one might call them, the rich quality of this ore amply repays for all dead work, and as compared with other producing mines gives results largely in favor of the Vekol, as will be seen from the following:

Statistics.

Between 550 and 600 tons of ore per month is milled. The ore is a chloride, much of which goes about 65 per cent in silver, and the mill works it up to 91 per cent of its assay value.

The lowest gross returns per month were \$17,000, and the highest about 25,000, and the total for 10 months was about \$218,000.

The cost of the ore, including every expense, such as salaries, insurance, repairs, milling, etc., is \$12.85 per ton. The milling alone costs about \$5 per ton.

The relative cost of the production of one dollar is 31 27-100 cents, leaving a profit upon each dollar produced of 68 73-100 cents. This is something marvelous, and yet the average profits during the current calendar are much better.

The proceeds of the mine in hullion, from July 1, 1885, to December 31, 1885, were as follows:

July	.....	\$ 11,190 99
August	.....	21,680 94
September	.....	25,375 93
October	.....	23,656 68
November	.....	19,699 50
December	.....	23,694 60
Ore shipped to Kansas City, being too refractory to be worked at their mill.	.....	8,774 00

Total.....\$133,973 10

The number of tons of ore worked for the above time and taken out of the mine to produce the above hullion was 3371.

The total expense of producing this hullion, in six months, was \$41,904.40.

The hullion output for 1886 was as follows:

January	.....	\$25,164 47
February	.....	21,407 31
March	.....	17,474 34
Total	.....	\$64,046 12

Number of tons worked for above results, 1766.

Total expenses connected with the production of above hullion, \$22,756.70.

Relative cost of production, 23 13 100 cents; relative profits, 71 87-100.

Cost of mining, milling and all expenses, in 1885, \$12.85 per ton; in 1886, \$12.88.

The above figures are taken from the records of the company and are correct in every detail.

The company employs quite a number of Indian Papagos and Quajates for car and wheelbarrow men, and they are fully equal in these positions to any other race of men. One Indian in particular is a skillful and experienced miner. The payrolls contain about 60 men on account of the mill and mine, and these do not include any of those engaged in other or out-door work. The payroll aggregates \$4200 per month.

An Orderly Camp.

There is, perhaps, no other mining camp in the United States so quiet and orderly. There is not a saloon in the camp, and, therefore, no drunkenness. A saloon was started there some months ago, and during a little carousal some trouble was feared. The Messrs. Walker saw the necessity of prompt action and at once forbade their employees patronizing the saloon under pain of peremptory discharge from their service. The result was the saloon was moved away. The Indians and Mexicans are encouraged to save their wages and accumulate money. The company own the only store at the camp, but they advise their employees to purchase only such articles as they actually need. Any employee found guilty of theft or any grievous offense is at once dismissed, and by these means the camp is purged of all its elements of evil, and those who are really striving to do well are given the utmost encouragement.

Personal.

The mill and mine are under the direct superintendence of the Messrs. Walker Bros.—Judge J. D. and Lucien E.—and from personal observation and general report it is safe to say that good fortune never fell into better or more deserving hands. They are conducting their business upon an honorable basis with everybody.

Judge J. D. Walker is one of the pioneers of Arizona, and has resided here 24 years. His brother, Lucien E. Walker, has been a resident of Arizona for 10 years, engaged for most of that time in mining and prospecting.

Mr. W. T. Day is the general foreman of the mill and mine, and has been connected with the mine for two years. He is a faithful and competent man.

Mr. F. C. Minshall has charge of the mill and mill office and looks carefully after the interests of the company, and his services are highly appreciated by the company.

Mr. H. Hines is the assayer and refiner and he is pretty generally one of the busiest men connected with the camp. He is fully up to the standard in his profession and is careful and correct.

The general bookkeeper of the company is Mr. D. D. Denure, an accountant of skill and experience.—*Tucson Citizen*.

A Great California Quartz Mine.

Its Two Hundredth Monthly Dividend.

On Monday the Idaho Mining Company of this district, says the Grass Valley Union, declared their 200th monthly dividend. An event of this kind is deserving of more than a passing notice, as there is no history of anything like that number of dividends ever having been paid by a gold mine on the North American continent, and goes as a living proof of the reliability of gold quartz mining when intelligently and honestly conducted, and at the same time establishes the value and permanency of gold-bearing veins of the Grass Valley district, which have also stood high in the estimation of practical miners since the first discovery of gold-bearing quartz on Gold Hill, in the year 1850. Since then the working of quartz has been the principal feature of mining in Grass Valley, and has been the chief source of prosperity of the district. The Idaho mine is on the same lode with the Eureka, being the first extension east of that once famous mine, which yielded over \$5,000,000 before the rich pay chute dipped into the Idaho ground. The Idaho location (of 3100 feet) was made in 1863, but legal complications prevented any work being done until late in the fall of 1864, when a prospect shaft was sunk near the Eureka line, on the south side of Wolf creek. Work was afterwards suspended, and not renewed until some time in 1865, when John C. and Edward Coleman, who had previously been the principal owners in the North Star mine, purchased a large interest in the Idaho. Under the superintendence of Edward Coleman the shaft was sunk to the depth of about 300 feet, when a drift to the westward encountered the pay chute. Almost immediately the success of the mine was assured, and not long afterward a 15-stamp mill was erected on the ground, which was subsequently enlarged to 30, and at a later date to 50 stamps.

The yield of the mine partially paid for development work and improvements, and in January, 1869, the first dividend was declared, and in all that year there were seven dividends, and since that time (17½ years) with but few intermissions regular monthly dividends have been paid, the ones announced for the present month being No. 200. In that time this product has been something over \$8,000,000, and the dividends paid therefrom somewhat exceeding \$3,750,000, or over \$1200 per share on the 3100 shares of capital stock of the original par value of \$100 per share. During this period the mine has been opened down to the 16th level, which is 2200 on the incline and 1600 feet in perpendicular depth, and the shaft is now being sunk for the 17th level. A remarkable feature of the mine is that the lode has carried but one pay chute, hearing eastward, and all the levels of the mine below the No. 7 have been driven eastward, as all the pay has been in that direction. The pay chute has varied in width and value, some of the levels having been driven 1200 feet through pay ore; but the ore was not always of high grade, although seldom so poor as not to leave a margin of profit. The dip of the pay chute is toward the Maryland ground, which it will ultimately reach, as the lower workings of the Idaho are well advanced toward the Maryland line. During all the real working history of the Idaho, Edward Coleman has been president and superintendent of the mine, and John C. Coleman treasurer the greater portion of the time, and that the administration of the affairs of the company has been in every respect faithful the remarkable success accomplished is sufficient evidence.

THE MAD OX MINE.—The Mad Ox mine was located in the fall of 1859 by N. A. Peckham, an old but energetic miner. In the spring of 1860 he erected a two-stamp mill near the mine. The battery used was made of wood, roughly hewn from the trunk of a tree; the stamps were also made of wood, the shoes and dies alone being iron. Finding that this process would not work, Mr. Peckham built an arrastra, which worked very successfully for awhile, but being tired of this kind of labor he retired from mining in the year 1876 and sold his property to Grotesford, Strode & Co. Wm. Bickford, one of the company, sold his interest in the property to O. P. Woodward, in 1878. A wagon road was completed from John Harrison's vineyard to the mine in the year 1878, and a five-stamp mill was erected at the junction of Mad Ox and Whiskey creek for the purpose of crushing the ore taken from the mine. The mine was worked quite successfully for a time and yielded large dividends; its widespread reputation soon attracted the attention of mining men and experts from all parts of the State. In the year 1880 J. B. Haggis, of San Francisco, bought the property and erected steam power, also placing another five-stamp battery in the mill. Seeing that the mine was a good one, Mr. Haggis started a Barleigh drill to work and completed a tunnel 750 feet in length, thereby tapping the mine 637 feet below the surface. Many pounds of bullion was taken from the mine during this period. Work was suspended on the mine in the spring of 1885, A. H. Shnabel then being superintendent. The mine has since been idle until about two weeks ago. Louis Reel and James Duffy, two good miners, obtained a lease of the property. They have prospected the mine thoroughly and are satisfied of doing well in their new enterprise.—*Shasta Courier*.

The Prospector.

This superstitious belief is an old one, that unless the discoverer of a camp meets an untimely or bloody end, his find will never amount to anything; and this seems borne out by facts, since nearly all the discoverers of the great gold mines in the United States, with but few exceptions, have, as the saying goes, "died with their boots on." Of 38 booming towns in the early days, the locators of 12 were killed by bullets, three were buried in their creations by cavings, and the rest drifted away with the tides of immigration, have become lost in oblivion or died and were buried in paupers' graves.

George H. Fryer, from whom the celebrated "Fryer Hill," of Leadville, derives its name, died at Denver not long ago from an overdose of morphia administered by his own hand. Two years previous to his death he was worth a million or so; but he died a pauper and almost without a friend.

Old Virginny, after whom the "Consolidated Virginia" was named, and who sold his claim for \$25, a pony and a bottle of whiskey, came to his death by an overdose from a hucking mule near Dayton, Nevada.

Bill Bodie, the discoverer of the great Standard mine, in Mono county, California, slept his life away in a snow storm while making his way to the mines.

Col. Storey, who gave his name to the county in Nevada where the Comstock is situated, was killed by the Pyramid Lake Indians.

Thomas Page Comstock died a beggar in a straggled land. "Old Pancake," as he was known in the mining camps, committed suicide at Bozeman, Montana, on September 27, 1870, by shooting himself. He was the leader of the famous Big Horn expedition that was sent out by Nevada capitalists in search of the Lost Cabin mines, supposed to be somewhere among the Big Horn mountains. The expedition was a failure, and Comstock, whether from disappointment or some other cause, while camped near Bozeman, drove a pistol ball through his head and died instantly. He was buried there, and his grave is unmarked and unknown.

Near the wild spot which 12 years before the hidden treasure of Alder Gulch was first revealed to him, William Fairweather was laid down to rest. Like poor "Old Pancake," this erratic soul stranded on the shoals of dissipation, although each in his day had turned a key—the one silver, the other golden—which unlocked millions for others but nothing for themselves. William Farrell, who "struck" Meadow lake, died a victim to remorse in one of the leading hospitals of San Francisco, "haunted by the spirits of 1000 deluded pioneers and prospectors passing and repassing his dying bed."

The locator of the famous Homestake, in the Black Hills, is said to have afterward turned road agent. Times going hard with him, he attempted to stop a stage loaded and prepared for just such emergencies, and he was planted alongside the road by the tender-hearted express agent whom he had tried to rob and kill.

Homer, of Homer district, followed in the suicidal tracks of Comstock. After squandering a small fortune he shot his brains out on the streets of San Francisco.

Doughnut Bill, "Old Eureka" Kelse Austin, Lloyd Magruder, "Nine-Mile" Clark and George Hankinson, Henry Plummer and scores of others died violent deaths in one way or another, and reaped nothing from the rich finds each had made in his day.—*Montana Cor. St. Louis Globe-Democrat*.

SHASTA MINES.—Gold mining was once the leading industry of Shasta county, but it has gradually and almost ceased. During the past two years, however, much prospecting for quartz has been done and with the best of success. Many silver and gold mines have been opened up, new quartz mills erected and supplied with the most approved and expensive machinery. The principal districts lately developed are the Iron Mountain mine, 14 miles from Redding, where \$125,000 worth of machinery has been put in place the past season. In the Slate creek district, 35 miles north of Redding, \$100,000 has been invested in machinery. Numberless sales of claims have been made at high figures. Great activity prevails at French Gulch. Many new mills are being erected, and in the Old Diggings, eight miles north of Redding, a number of mills are paying well. At the Tellurium mine, near the town, a mill is in process of construction and will soon add largely to the wealth of the county. Rich iron and copper ores have been discovered in vast quantities. Marble, lime and sandstone are found in abundance. Coal has also been discovered.

CUSTOM SAMPLER.—Let our miners rejoice, for at last a scheme is on foot for the erection of a custom sampler in this city. It has been quietly worked up and will be owned entirely by Conway, Posey & Hewkins, Meredith & Ailman, John S. Swift and Dan'l Coomer. The motive power will be furnished by the Flagler works, but the machinery will be in a separate building and will not be otherwise connected with the Flagler concern. A side track will be run from the railroad alongside of the building, that ore by the carload may be handled at a slight expense. It is the intention of the promoters of the enterprise to buy ores. All of the preliminaries have been arranged and the new building will soon be in course of erection.—*Silver City Enterprise*.

The Hartsfeld Smelter.

Sixty Tons of Ore Smelted at Cœur d'Alene.

Through the courtesy of Alfred Brile, of the Kentucky Mining and Smelting Company, says the Cœur d'Alene Record, we received at a late hour this afternoon a report of the trial of the Hartsfeld smelter at Milo.

After repeated delays and discouragements the smelter was started at 8 A. M., May 26th, and tapped the first slag 30 minutes later. The ore ran from several different mines, the names of which it is not necessary to give. The furnace was started without lead in the lead well, and after a run of four hours seven bars of bullion, weighing 700 pounds, were drawn; a result equal to the highest expectation of those interested.

The average amount of ore run while the test was being made was 2500 pounds per hour. There is no question but that the furnace will smelt 30 tons per day, and do it easily. That is all that has been claimed for it at any time. With the necessary amount of flux, the slag when tapped run as freely as water. An average of 40 bushels of charcoal was used to every ton of ore, 2400 bushels in all being used. The charcoal was poor, it having been burned last February, since which time it has lain out exposed to the weather, without any covering whatever. After a run of two days, and when 60 tons of ore had been smelted, the smelter was shut down, the bottom of the furnace dropped, all thoroughly cleaned, the bottom replaced and everything put in readiness to run again in less than two hours. The condenser saves 10 per cent of the original weight of the ore, and there is no drawback whatever about the operation of any portion of the machinery.

Assayer's Report.

The following is the report of Longee & Co., who completed the assays to-day:

Bullion—64.41 ounces in silver.
Flue dust—6.08 ounces in silver.
Slag—Trace of silver and lead.

Ore Assays.

No. 1—13.37 ounces in silver and 55 per cent lead.

No. 2—9.72 ounces in silver and 37½ per cent lead.

No. 5—1.32 ounces in silver and .03 per cent lead.

Only one ton of the best ore mentioned (No. 1) was run, 50 tons being from Nos. 2 and 5.

The above figures speak for themselves and need no comment. The result of the test run banishes all doubt as to the success of the enterprise, and we heartily congratulate Mr. Brile and the company, for whose interests he has been such an able and untiring worker. All who are familiar with the progress of the work know that it has been pushed with energy in the face of many difficulties and discouragements. Its success means much for Cœur d'Alene and especially for Yreka district. Miners should do all they can to encourage, and nothing to discourage, the development that ought now to be rapidly made. All the gentlemen connected with the Kentucky Mining and Smelting Company merit a rich reward, and we heartily hope they will get it.

GOLD AND SILVER.—London advices state that the Royal Commission on the Depression of Trade has issued its third report, which concludes as follows: "Regarding trade transactions between gold using and silver-using countries, it is probable that inconveniences and serious losses have arisen from fluctuations in the relative value of the metals, especially when these changes are numerous and sudden. It is even possible they have tended in certain cases to divert the course of trade and to produce the depression from which this country is now suffering." The commissioners offer no direct opinion on this question themselves. They circulated a number of questions among gentlemen who from their practical experiences or researches into the subjects appeared likely to afford useful information. The answers received to these questions will, they think, afford material for the prosecution of further inquiry into the subject. The commissioners propose, in their final report, to draw attention to those portions of the evidence already given which bear upon the effects produced on our trade by the existing state of the metallic currency of the world. They are strongly of the opinion that the question deserves separate examination from other points of view than that of the commission, and apart from its general connection with the depression of trade. It should be treated with reference to England's currency system as a whole, and in relation not only to her commercial policy, but to her colonies, to India and to foreign countries. In conclusion, they say: "We humbly submit to your Majesty that from the general anxiety expressed on the subject, the necessity for such inquiry is urgent."

PROPOSED MINING TUNNEL.—On account of the heavy body of water in the Mayflower mine, the rich gravel drift claim at Forest Hill, Placer county, the pumping machinery is being taken out and preparations are being made to run a tunnel 5000 feet in length to strike the gravel channel at its lowest depth. Two shafts will be sunk on the line of the tunnel and five facers will be worked at once with the aid of compressors and power drills.

The Symes Mining Bill.

The changes in the Revised Statutes of the United States respecting the location and boundaries of mining claims as proposed in the bill recently introduced by Judge Symes have awakened considerable interest and caused lively discussions in the mining camps. The full text of the Symes bill is given below. While the proposed changes would undoubtedly check opportunities for litigation upon flat deposits and give original locators greater scope for securing the full benefit of their discoveries upon such deposits, they may, on the other hand, work detrimental to the interests of fissure vein claimants.

The bill amends Sections 2320 and 2322 of the Revised Statutes, and is as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

That Section 2320 of the Revised Statutes of the United States be, and the same is, hereby amended to read as follows:

"Section 2320. Mining claims upon veins or lodes of quartz, or any other kind of rock in place, bearing gold, silver, cinnabar, lead, tin, copper, or any other kind of valuable mineral deposits, hereafter located, may equal, but shall not exceed in area, 20 acres; but no location of a mining claim shall be made until the discovery of the vein or lode or other character of valuable mineral deposit within the limits of the claim located. Lode mining claims may be located in such form on the surface as the discoverers or locators thereof may desire, subject to the following limitations:

"That such claims must be substantially in the form of parallelograms where the boundaries of adjoining prior located claims or prior owned lands permit; and the length of such mining claims shall not be more than one-third greater than the width thereof."

Section 2. That Section 2322 of the Revised Statutes of the United States be, and the same is, hereby amended to read as follows:

"Section 2322. The locators of all lode mining claims or locations which shall hereafter be made on public mineral lands of the United States, their heirs and assigns, where no legal adverse claim or right exists at the date of discovery and location, so long as they comply with the laws of the United States and with the State or Territorial laws and local regulations not in conflict with the laws of the United States governing their pre-emption and possessory titles, shall have the exclusive right to the possession and enjoyment of all veins, lodes, and of all mineral deposits of every kind and character found or existing within the boundary lines of said lode mining claim extended downward vertically. Nothing herein contained shall be construed as giving any locators or owners of mining claims a right to follow any vein or mineral deposit outside of the vertical boundary lines of such claims."

Section 3. That all acts and parts of acts inconsistent herewith be, and the same are, hereby repealed.

THIRTY-SEVEN ENJOINED.—The Plumas National has the following: The last straw seems to have been added to our camel-load of trouble by the Superior Court of Sutter county. On the 25th of May last a complaint was filed in that court by the district attorney of that county, the county being named as plaintiff and 37 companies and persons engaged in mining on the tributaries of the north fork of Feather river as defendants. From the 8th to the 10th inst. the defendants were made recipients of peremptory writs of injunction issued on such complaint, and compelled to desist from mining. This proceeding was not unexpected. Some two months since our county was visited by one "Charcoal" Smith, an emissary from Sutter county. For the benefit of our readers we call attention to a few statements of the complaint. The wrong complained of is the prospective injury to the Sutter County Hospital and its grounds, valued at about \$3000. We learn that, prior to the days of hydraulic mining, the Feather ran in a well-defined channel, between natural banks sufficiently high to confine its waters and protect the land from overflow; that the deep holes in the river have been filled by tailings, thereby facilitating the downward flow; that defendants discharge during the mining season of each year 2,000,000 cubic yards of solid material into the river, 80 per cent of which eventually flows into the valley part of the main Feather; that it has so filled up the channel as during times of high flood to cause overflow and damage; that by reason thereof, plaintiff's said property has become greatly depreciated in value, and, unless defendants are enjoined, the said property of plaintiff will be utterly destroyed. The complaint is sworn to by one Metteer, a member of the Board of Supervisors.

The press of all the mining territories should lose no time in emphatically denouncing the Plumb bill now before Congress. A strenuous protest should be entered against its passage. It appears to have originated in a desire to prevent foreigners from obtaining great areas for cattle ranges, but it is said also to prevent them from purchasing or otherwise acquiring mining property. It will be seen at once that if it becomes a law it will be a serious blow to mining industries in many places. What we want is capital, foreign or domestic.

COMSTOCK ORE AND BULLION.—An abstract statement of the hullion product of the mines in Storey county for the quarter ending March 31, 1886, shows during that period 68,283½ tons of ore were extracted and crushed, the hullion product from which foots up \$816,464.96. The total cost of mining, transportation and converting it into hullion is given at \$834,879.64.

The Young America Mine.

The Sierra Tribune says: After going through the company's mill (as fine a mill as there is anywhere) we started up the trail to the mine. The distance by the bucket tramway, by which the ore is brought down from the mine, is 3200 feet, but we concluded before we got up that there must be some mistake about it. Arriving at the mine, we were taken in charge by Foreman Wm. Busch, provided with overalls, jackets and candles, and started in at the lower tunnel. We walked through tunnels and lateral drifts, climbed up slippery ore chutes, went through all sorts of narrow holes on all fours, and, after nearly two hours' hard work, emerged at the mouth of the first incline that was sunk on the vein. We do not pretend to be very well up in mining matters, but it was a curiosity to see the eyes of our companion, Dr. Hutchins, who is an old silver miner, stick out. There is good ore everywhere. There is hardly a place in the mine where the vein is less than four feet thick, and there are stopes now open where it is ten feet wide for long distances. The best of it is, it is all good ore, and there is a great deal of it very high grade. On the foot-wall there is a clay gauge of from four to six inches, and the hanging-wall is everywhere true and smooth. As the workings get deeper the vein stands more upright, making it easier to work. The ground is timbered in the most substantial manner, and every worked-out stope is carefully filled with "deads." All the drifts are laid with tracks of T rail, and cars are quickly loaded from chutes that are full of ore. This mine has now been working nearly two years, but a good beginning has hardly been made on the vast quantity of ore in sight. A tunnel has been started that will strike the vein several hundred feet below the present workings. We expected to see a good mine, but were not prepared for the great mine we saw. None of the present owners will live to see the Young America worked out. Superintendent Mead and Foreman Busch are "the right men in the right places."

THE BLOOD AGATE FIELDS.—Some eight miles from Cisco, on the Grand river, a large field of stone has been discovered, of a peculiar nature and of variegated and brilliant hues, which has puzzled mineralogists to classify, and which bids fair to add materially to the wealth products of the Territory. This stone, when cut and polished, resembles the beautiful Scotch bloodstone, now out of the market, and is capably adapted for all kinds of ornamental purposes and for jewelry. It lies on the surface ground, from the river back to the rising mesa, and covers a territory of some three square miles. In no other spot along the river or in the adjacent country has anything like it been found, nor in the country at large, except a small deposit, now exhausted, found in the State of Arkansas. Specimens have been exhibited in the city, and pronounced by jewelers as excellent for rings, pins, etc. The great value of the find lies in the enormous amount of the material, which is, in size, large enough to build mantels and other household adornments, and when placed upon the market it will doubtless meet a ready sale. A company is now incorporated to work this bonanza, and the gains will accrue to the benefit of several poor men, who originally found it.—Salt Lake Democrat.

STOCKHOLDERS ASK FOR A DIVISION.—Suit has been commenced in the Superior Court by A. C. Ellis and R. E. Doran against W. J. Sutherland, to recover \$59,290.66 on a contract to divide the proceeds of the reincorporation and sale of the Princess Mill and Mining Co., of New York, and the White Mountain Water Co., of Nevada. In the complaint it is alleged that the plaintiff executed an agreement with defendants in September, 1883, to equally share in the proceeds of the sale of the property of these companies, to the Candelaria Water Works and Milling Co., of England. The defendant was to pay them one-third of \$50,000 after the sale, which took place in London, and deliver to them 28,333 shares of Candelaria stock, the expense of completing a 30-stamp mill, however, to be deducted from the money. The contract was to be concluded before the 12th of last month. The terms of the contract, it is alleged, have not been complied with as far as the payment of the money and delivery of the stock is concerned, hence the suit.

GOLD IN COLOMBIA.—A Washington dispatch tells about an American expedition to the United States of Colombia. The dispatch said S. P. Bell furnished part of the money to equip the expedition. Bell said, yesterday: "There is plenty of gold down there. The climate is not unhealthy. The trouble is chiefly dealing with the inhabitants. They smile in your face and stab you in the back. They put off everything until to-morrow so often that an American loses patience. There is no way of getting machinery and supplies to the mines except on the backs of mules and Indians. It is tantalizing to think of the gold there that is just beyond the tips of your fingers. To get at it one would need to take 1000 well-armed men with ample supplies, and they would have to be familiar with the Spanish language and Indian lingo to make any headway. Such an expedition, if well disciplined, could bring back a shipload of gold; but anything less imposing is sure to get stranded in Carthage."

Strength of Timber in Building.

It is a fact well known to architects that the more kinds of materials we put into a structure the more we multiply differences of expansion and contraction, and in some cases that we have had our attention called to, the structure has been found sadly out of line, and its general appearance deteriorated by the difference in contractility of materials, and even kinds of one material, of which composed. Suppose, for instance, we construct a building 11 stories high, the walls of brick, wooden girders and partitions; we place joists across; these are green; we have 11 floors laid upon this green timber. The studding for each story is placed upon a firm foundation in the basement, directly over the top of which the partition timbers of the adjacent story are put, followed by another and another until the roof or rafters are reached, when the timbers or studding for the last story are the principal and often the only support. If we allow the usual per cent for shrinkage by seasoning, it is unreasonable to suppose that, with this 11 feet in width, the joists will so shrink that the roof will, by its own gravity, fall nearly one foot? Then, is it not equally pertinent to conclude that the base of the rafters resting on opposite walls alone will tend to crowd out until the apex finds solidity on these studs of the center, and thereby rendered unsightly, and possibly unsafe?

If mill-owners and operators, in filling orders for large stuff, would see that their timbers were gotten out so as to lie on edge when in position, and architects see that they were placed in position, as ordered, the shrinkage would only tend to make the joists stronger and the floors more solid. These are little things of themselves, but in the aggregate assume great importance, and more especially to those who pay the little bills or suffer the inconvenience of occupying buildings all askew.—California Architect.

MASTODON REMAINS.—C. W. Remsburg informs us that a discovery was made a few days ago on the ranch of his uncle, William Hazleton, that must be interesting to scientists. Mr. Hazleton lives in the edge of the foothills, five miles northeast of Centerville, on Kings river. Numerous bones were seen protruding from the bank of a small stream running through his ranch, and an investigation was made. The bones were about 10 feet from the surface of the ground. Among the remains were a number of large teeth, weighing about seven pounds each. Several very large bones, which fell to pieces and crumbled away immediately upon being exposed to the air, were unearthed. Among other relics were two enormous tusks, evidently having belonged to two different animals. The large one is over four feet in length and eight inches in diameter at the base. The other, which is considerably smaller and shorter, lay in such a position as to suggest that these leviathans may have come to their death in mortal combat. This locality has not been thoroughly examined, but the find must be of great interest to students of the ancient biology of this territory.—Fresno Expositor.

THE SAVAGE LEANING TOWER.—The tall brick chimney at the Savage hoisting works, if it doesn't tumble over, bids fair to become as celebrated an architectural curiosity as the famous leaning tower at Pisa, in Tuscany. The base of the chimney on the south has settled until the top leans two feet from the perpendicular. This can easily be distinguished by viewing it in a line with awning posts on the west line of C street. Notwithstanding the settling of the structure the masonry shows no sign of fracture.—Virginia Chronicle.

A SILK FACTORY PROJECTED.—It is said that the Visitation Manufacturing and Improvement Company will fit up within the next two weeks an old establishment in the neighborhood of the Six-mile House, on the San Bruno road, for the purpose of starting a factory for the manufacture of silk goods. The experiment was tried some eight years ago at the same place, but was given up. The establishment will be the only one of the kind on the coast.

VANITY.—Some one has said that every Englishman is an island and every American a Declaration of Independence. The Frenchman is vain because he belongs to so great a country, and the Englishman boasts because so great a country belongs to him. A Scottish driver of pigs once avowed that he was in some respects a greater man than Wellington, because the Duke could not have driven 700 pigs from Edinburgh to London, as he had done, without losing a single head.

OUR COAL SUPPLY.—One-fifth of all the coal produced in the United States is taken from the mines of only four counties of a single State, of which locality Pittsburgh is the business center. Nearly one-third of all the coal there raised is converted into coke—a business in which \$13,000,000 is invested and which gives employment to an army of 6000 men.

A LARGE WOOD SHAVING.—The widest shaving ever made by a wood-working machine was recently placed on exhibition in a store in Winchendon, Mass. It was 42 inches wide, several feet long, and of uniform thickness.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, June 26, 1886.

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Passing Events.

The great Combination shaft on the Comstock has reached the depth of 3250 feet, and sinking has been discontinued for the present. A lateral drift north will soon be run and we shall see what will be found at the great depth indicated.

The strike among the iron-workers in this city against one of the foundries is an event of great local importance, and both employers and workmen are confident that they will be able to carry their point.

Mines all over the country are now in full swing, and a good summer's work is anticipated in many directions. California gold mines are still in good demand and being sought for.

Oregon and Idaho are both looking up this year and are attracting more attention from miners than heretofore. The news from Cœur d'Alene is quite encouraging for both placer and quartz.

The MINING AND SCIENTIFIC PRESS closes a volume with this number, and will begin a new one with renewed vigor and every promise of successful improvement.

THOUGH there are more men at work in Taylor now than at any time past, business men complain that it is much duller than a year ago.

Close of Volume LII.

Volume LII of the MINING AND SCIENTIFIC PRESS closes with this number.

As the PRESS is the oldest mining paper published in the United States, it is but natural that it should have long since established itself as an authority on this subject, and its patronage and prestige should have increased. With this widening of the mining field which has taken place in the last decade its influence has also widened by reason of its larger number of readers and patrons. There are thousands of men now engaged in mining where there were formerly hundreds, and mining is conducted in these days on a much better basis than 10 years ago. The methods, operations, systems and processes have all undergone more or less change. These changes are recorded in the PRESS as they occur, with all necessary details which would prove of interest to the progressive class of readers it has.

Abundant space is given for the current mining news, and a carefully compiled and condensed summary of this is given each week. Every effort is made to obtain all available information on mining and metallurgy which will be useful in the every-day work of the mining community of the coast. The selected matter is chosen with judgment, derived from long experience in the work. Our numerous correspondents aid us materially in bringing fresh information to the attention of our readers. The important progress in mechanics and science is duly recorded, care being taken to eliminate all but the really practical matter as far as possible.

In the matter of illustrations it has been the endeavor of the editors to bring attention more particularly to mechanical appliances of mining and metallurgy, interesting geographical features, and various kinds of machinery, which would be of practical use to the industrial classes of this coast. New inventions of interest have been given, and the more prominent Pacific Coast patents have been described. The very full index on the last page of this number gives a good idea of the scope of the subjects embraced in the columns of the PRESS.

As recently stated in these columns, the hullion product of the coast is gradually, but surely, increasing, showing conclusively the stability of the mining interests. So important an industry must maintain a representative journal devoted to its interest. It is no more than should be expected that miners everywhere should lend their aid and support by subscription and correspondence, and second our efforts in improving the PRESS. Those who are already its readers should call the attention of others to its merits, and induce them to become subscribers. With increased patronage greater improvements can be made. We aim to constantly improve the paper in every way and make it worthy of the patronage it receives. As a new volume commences a suitable time to subscribe is offered, for indexed files of the PRESS form a valuable mining and metallurgical library for reference at any time.

California Observatories.

The great dome, 70 feet in diameter, of the Lick observatory is being made by the Union Iron Works in this city, and is expected to be in place by November. The mounting for the telescope is in course of construction and will be sent here before long. Professor Holden expects that the whole observatory will be ready for use by August of next year. The work is being pushed as rapidly as possible, though much remains to be done, the great object glass not yet having been forwarded.

The Chahot observatory at Oakland is now open to the public on application to the superintendent, Fred M. Campbell. The assistants, Messrs. Chas. Burkhalter and Chas. Hill, are in nightly attendance. They have set the transit instrument, and the clocks, etc., are now in good order, so that observations for correct time are now possible. Parties visit the observatory every clear night.

Professor Frank Soule, of the Department of Astronomy of the State University, announces that the Students' observatory at Berkeley, now completed, will be open to visitors as follows: On the first Monday in each month, to the members of the several faculties of the University and the officers thereof, with their families; on the second Monday, to the

members of the senior and junior classes of the University; on the third Monday, to the members of the sophomore and freshman classes; on the fourth Monday, to the public generally. All are cordially invited to come as above specified. At all other times the observatory will, of necessity, be closed to visitors, owing to the regular work of instruction.

Pacific Coast Lighthouses.

The engineers of the lighthouse service on this coast have had some rather different experiences than has been met with elsewhere in the matter of fogs. The lighthouses which were built after the first settlement of the coast were put on the high headlands, as has been the custom all over the world. It was found, however, that many were too high, and if placed nearer water would throw light under the fogs which prevail here in summer. Several had, therefore, to be rebuilt, notably those at Point Bonita, at the entrance of this harbor, and at Point Conception. All the later lights have, in consequence of this experience, been built nearer the sea level.

More lighthouses will shortly be built on this coast, appropriations having been recommended in Congressional committee as follows: For continuing the lighthouse northwest of Seal Rock Point, St. George, Cal., \$50,000, the entire cost to be \$450,000; for completing a first-order light and fog station at Destruction Island, W. T., \$45,000; for construction of a second-order light at Point Sur, near Monterey, \$50,000; for construction of a second-order light at San Luis Obispo, \$50,000.

A first-order lens is about eight feet in diameter and 13 feet in height. The burner in the lens has nothing remarkable about it. It has a wick about four inches in diameter only. It is seen, however, at a distance of 30 miles. This is wholly due to its position in the reflector and the ingenious and scientific arrangement of the perfect glass triangle. Above the light is a tank filled with lard oil; below it is a reservoir, and a pump raises the oil to the upper tank, where the heat of the light keeps it from thickening. The chief duty of the tender is to keep the light in order and the reservoir filled. Said an expert: "It is not the isolation of the lighthouse nor its altitude that makes the first-order light visible for so many miles. It is the remarkable reflector which the lantern contains."

The lens to be placed in the second-order lighthouse at San Luis Obispo will cost \$20,000 when that structure is erected. The light which nightly glitters on the Farallones is thrown from a highly-polished and brass-trimmed reflector which cost upward of \$25,000. The light at Point Bonita, a second-order light and comparatively small, cost from \$8000 to \$10,000. There are first-class lights, similar to that at the Farallones, at Cape Mendocino, Point Arena, Pigeon Point, Point Conception and Piedras Blancas; that is, they are similar as regards reflectors. First-order lights are placed at commanding points or headlands. Some glow steadily with an unfailing signal, seen far out at sea; some revolve and flash.

MEXICAN MINING CODE.—A very useful little work for those interested in Mexican mines has been issued by the El Paso Times, El Paso, Texas. It is the new mining code of the Mexican Republic, and comprises also the ordinance providing for the organization of commissions, and a tariff of regular fees and salaries. The book is neatly printed and is sold for \$2. The work is one which many miners have wanted, as it comprises everything relating to laws concerning mines in Mexico.

ONE day last week in the New Almaden quicksilver mine, while prospecting an abandoned drift which had not been worked for more than 20 years, some miners found the skeleton of a man with a bullet-hole through his skull. It is believed at Almaden that the remains are those of Gumesindo Luera, a miner who disappeared about 20 years ago.

THE Paradise Valley Mining Company are talking of building a tramway from the mine to the mill, a distance of five miles. It is proposed to set up an endless wire rope between the two points, and carry the ore in buckets suspended from the rope. The estimated cost of the tramway is about \$35,000.

Foundry Notes.

"The Iron-workers' Strike."

The principal topic of interest among the foundrymen and iron-workers of this city is the strike at the Union Iron Works. The trouble originated in the boiler-makers' shop of the works some weeks since, and these men went out. The other trade unions, after some hesitation, joined these, and the hacking of the Federated Iron Council caused the others to go out too. This issue involved is not one of wages, but of the employment of non-union men. The union men wanted certain so-called "scabs" discharged from the shipyard; the managers deny having any employed, as the men so called have an organization themselves called the Wood, Iron and Ship-builders' Union. Between 200 and 300 men have quit work, but the works are not closed down, there being some 250 or 300 men in the shops, comprising those who did not leave, and others who have been engaged since. The manager of the works, Mr. Dickie, says: "The severe competition in all iron manufactories in this State, and the constant curtailing of business owing to dull times and the presence of agents of Eastern manufacturers, have cut down business in this city most seriously; the actual and threatened troubles in the labor market here have added to our difficulties, so that with our best efforts and strictest economy there is not much profit left, and the directors of the Union Iron Works propose to reserve to themselves the right to employ such men as suit the demands and exigencies of their business, without consulting any man or any body of men."

"We will be able to fill the positions made vacant by the pattern-makers in time. It may take a month, or it may take longer. We will also secure all the men we need; possibly it will take six months. But we are prepared for that and have not gone into this business to make a week's fight, but are prepared to give them all the battle they will want. We have at present all the men in the boiler factory that we can accommodate, and time will show that the other departments will be equally well supplied. The company is just as firmly determined as ever to make a decided stand, and under no consideration will the demand of the unions be acceded to. The fact of the matter is, these men demand of us what we cannot grant. We cannot and will not give way to them."

"In regard to our having work enough on hand to keep us busy two years, with a full force of men, such may be the case; but even so, two years is a long time and there is nothing to prevent us sending a portion of the work even to Europe to have it completed, and rather than give in to these men such a course will be pursued."

"The boiler-makers, backed by the Federated Trades, have demanded that we discharge all men in our employ who are not members of a union belonging to the federation. On that proposition the position of the company is just this: That they will not discharge a single man at the dictation of any union or any association of men. We have no antagonism for the unions, and have never taken particular interest in the question as to whether men belonged to unions or not, as long as they did their work properly. We do not propose one set of men can come to us and tell us another set of men shall not work. That is a proposition upon which we are firm, and we might as well shut up the works at once if we cannot run them to suit ourselves."

The iron-workers' side is summed up by one of them as follows: "This whole question with us is simply a matter of unionism. We have nothing to complain of ourselves, but as members of a union which belongs to the federation, we must support a strike which is ordered by the council. Such a strike has been decided upon, and we have nothing to do but to go out or be expelled as scabs. We have decided that the claims of the boiler-makers are just, and therefore we willingly assist them."

Among other opinions advanced by workmen which are worthy of note was that of one who made the appended statement:

"We belong to a federation, the objects of which are to aid us every possible way and to protect our rights against those who would infringe them. The council of that federation, composed of the ablest men in the organization, after mature deliberation have decided that it is to the interest of the federation to uphold the boiler-makers in their strike. That is all there is to the question."

Working Gold-Bearing Sulphurets.

Concentration and Chlorination in Nevada County, Cal.—No. 7.

(Written for the Press by C. A. SCHENCK.)

After the addition of the precipitant the solution is well stirred with a wooden paddle, so that the sulphate of iron gets well mixed with the lixivium and all the gold is precipitated. To be sure in this latter respect an excess of the sulphate of iron must be present, which is tested in the following way: In the beginning of the leaching, when the gold solution flowing into the tub is strongest, from one to two pints of it are set aside in a glass, whereupon, after the addition of the iron salt and stirring with the wooden paddle, and having also waited a few minutes to give the gold time to settle, a sample is taken from the vat in another glass, to which is now added some of the strong solution set aside. Enough of the sulphate of iron has been used in the gold tub if a precipitate is produced in this test. To be certain that all the gold has been leached out of the mass of ore in the chlorination vat and transferred to the precipitating vat, a test is made by means of the iron sulphate.

The Precipitated Gold

Which is obtained in this part of the process is of a brown color and in a finely divided state, and must be first washed and dried before being melted. The washing is performed in the following manner: The brown precipitate is transferred to a porcelain dish of required size and boiled on a sand-bath with sulphuric acid; after the boiling and subsequent addition of water the mass is transferred to a filter, drained and washed with hot water. The drying of the washed precipitate is done in an iron pan; the dried gold is then melted in a black-lead crucible and run into bars.

The mass of ore in the chlorination vat, out of which the gold has been leached as described, still contains

The Chloride of Silver,

For which the leaching agent is hyposulphite of lime. But the leaching of the silver by the last-named solvent is not done in the same vat, though there is no valid reason for not doing it. The ore being deprived of its gold, and having been left to drain for about 24 hours, is shoveled into similar tubs, standing on a lower level, whereupon water is first run through the mass to wash out the remaining base metals soluble in it, and when this is done the leaching with the solution of the calcium hyposulphite begins. By means of a trough in front of the line of tubs the silver solution is conducted to the silver precipitating tubs. The outflow should be so regulated during the leaching that the solvent covering the surface of the ore remains at about the same level. The wash water is not utilized. The trough in front of the tubs is divided longitudinally into two partitions, through one of which the wash water runs to waste. As soon as the hypo follows, which is indicated by a sweet taste, showing that silver has been dissolved, the stream is turned into the other partition, from where it runs into the silver precipitating tubs, in which the silver is precipitated by a solution of calcium polysulphide. An excess of this precipitant is carefully avoided because this excess would subsequently be carried back into the silver leaching tubs with the solution of the calcium hyposulphite, precipitating there silver as a sulphide, which would be lost. For this reason it is safer to leave a little silver in the hyposulphite solution, which is not lost, while on the other side it furnishes sure evidence that no excess of the precipitant has been used. That such an undesirable excess is present is easily detected in the following manner: Take in a test tube some of the clear solution from which the sulphide of silver has settled, and add a little dilute acetate of lead. A precipitate of sulphide of lead will appear if a trace of the calcium polysulphide is present. More of the silver solution must be run into the tank if such an excess is found.

In the Reaction,

Which resulted in the precipitation of this sulphide, the calcium of the polysulphide has taken the place of the silver in the soluble hyposulphite of silver, the silver itself combining with sulphur, which combination being insoluble forms a precipitate. In the remaining solution the hyposulphite of lime is regenerated, whereupon it is conducted to a well, from which

it is raised to the distributing tank for subsequent leaching.

The precipitate, consisting mainly of sulphide of silver, is cleaned out of the precipitating tank and transferred to a cloth-filter, from which the solution drains off; after washing it with hot water, draining again, pressing and drying, it is roasted in a small reverberatory furnace. The roasted mass is then melted in black-lead crucibles with scrap iron, which takes up the remaining sulphur.

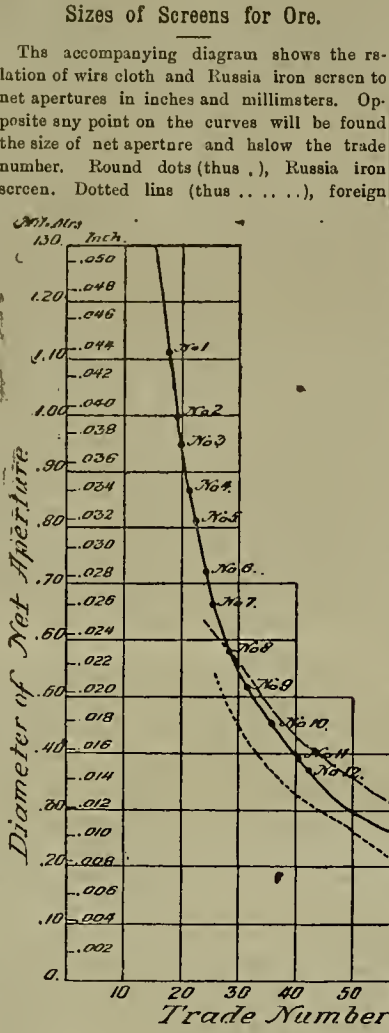


DIAGRAM SHOWING TRADE NUMBERS OF QUARTZ SCREENS.

steel-wire cloth. Dotted line, thus . . . domestic; full line (thus —), brass wire cloth.

This diagram was constructed from the following data by Luther Wagoner, M. E., a member of the Technical Society of the Pacific Coast.

TABLE No. 1.						
SHOWING THE NET SPACE BETWEEN THE WIRES OF CLOTH USED FOR BATTERY SCREENS AND SIEVES. SAN FRANCISCO, CAL.						
TRADE NUMBER OR HOLES TO THE LINEAL INCH.	Brass wire cloth.		Steel wire cloth. Foreign.		Steel wire cloth. Domestic.	
	m. m.	Inches.	½ m. m.	Inches.	m. m.	Inches.
12.....	1.55	0.0610	.....	.....	.....	.....
14.....	1.32	0.0520	.....	.....	.....	.....
16.....	1.25	0.0490	.....	.....	.....	.....
18.....	1.09	0.0430	.....	.....	.....	.....
20.....	0.94	0.0370	.....	.....	.....	.....
24.....	0.73	0.0290	0.69	0.027	0.64	0.025
30.....	0.55	0.0220	0.56	0.022	0.46	0.018
35.....	0.47	0.0190	0.49	0.019	0.38	0.016
40.....	0.40	0.0160	0.42	0.017	0.33	0.013
50.....	0.30	0.0120	0.35	0.014	0.25	0.011
60.....	0.25	0.0100	0.29	0.011	0.19	0.008
64.....	0.24	0.0090	0.28	0.011	0.18	0.007
70.....	0.22	0.0090	0.25	0.010	0.16	0.006
80.....	0.20	0.0080	0.23	1.009	0.14	0.005
90.....	0.18	0.0072	.....	.....	.....	.....
100.....	0.16	0.0061	.....	.....	.....	.....
120.....	0.12	0.0050	.....	.....	.....	.....
150.....	0.08	0.0030	.....	.....	.....	.....
160.....	0.06	0.0025	.....	.....	.....	.....

TABLE No. 2.			
MEASUREMENT OF THE THICKNESS OF THE STANDARD NEEDLES USED FOR GAUGING HOLES IN RUSSIA IRON BATTERY SCREENS. SAN FRANCISCO, CAL.			
TRADE NUMBER OF NEEDLE OR SCREEN.	Diameter of needle or hole in m.m. Calculated.	Diameter of needle or hole in inches. Measured.	Nearest trade number of brass wire cloth.
No. 1.....	1.110	0.0436	No. 18
2.....	0.996	0.0392	18
3.....	0.950	0.0374	20
4.....	0.863	0.0340	20
6.....	0.813	0.0320	24
7.....	0.720	0.0284	24
8.....	0.662	0.0261	24
9.....	0.580	0.0228	30
10.....	0.515	0.0203	30
11.....	0.452	0.0178	35
12.....	0.391	0.0154	40
13.....	0.375	0.0148	40

Academy of Sciences.

At the last meeting of the California Academy of Sciences a paper was read by Mrs. Mary K. Curran, entitled "A Botanical Excursion in Marin and Sonoma Counties." Mrs. Curran walked, by herself, from San Rafael up as far as the mouth of Russian river, from there to Duncan's Mills, and thence to Healdsburg, where she took the cars for home. During her trip she collected large numbers of botanical specimens.

Dr. H. W. Harkness made a report of his recent investigations of the water of Mono lake, particularly with reference to its forms of vegetable and animal life. The sudden reddening of a bottle of this water, which has for some years been standing in the academy, led to the discovery of a form of animal life which led to his trip to the Sierras this month. He found the flora and fauna of the lake waters to be great in variety and number. The ruby-red color was due to the presence of bacteria of a new species. Five or six other animal forms, some of them animal feeders, were found, as well as 14 varieties of plant life. Of these, the ephedra was dwelt upon most largely, the larvae of which are in shrimp form and much liked by the Indians, who find them very palatable. One could digest them readily enough when once divested of the idea of eating the larvae of the worm. These are the largest of the bacteria, without doubt, yet known.

President Holden, of the University, made an impromptu address upon the condition of affairs and progress of the work at the Lick observatory at Mount Hamilton, particularly with reference to the construction of the great dome and mounting of the telescope.

B. B. MINOR, a man well known from his connection with the mining developments of

this coast, died at Los Angeles on Monday last. His face has been a familiar one in most of the more prominent mining camps on the coast.

A DISCOVERY of tin ore is reported about 12 miles from Olympia, Washington Ter.

Movable Gauge for Miner's Inches.

One of the simplest forms for measuring water is described in a Government report upon the placers of Boise Basin, Idaho. In this particular case the box, made of one and a half-inch pine boards, is 48 inches wide, inside measurement, by 16-inch sides. Across the bottom, at the delivery end of the box, is nailed a one-inch cleat or strip, which serves the double purpose of holding the lower part of the gauge box in place and of raising the aperture above the bottom of the box. Six inches above the upper surface of the cleat is a wooden bar nailed across the box and parallel to the cleat beneath. The bar is three inches high and is roughly marked at intervals across the upper edge of the supply side by saw-notches, which may be numbered by pencil marks. The orifice is therefore six inches high, and when fully open is 48 inches wide.

If the water in the box rises to the top of the cross bar, the head is then three inches above the top of the surface, or six inches above its center. Each inch of width of the aperture delivers six miner's inches, or a total of 238 miner's inches for the cross section of the whole aperture. The quantity of water allowed to pass through the box is determined by a gauge-board split to the required width and inverted vertically behind the cross-bar and bottom cleat, which holds it in position. In using this box in a ditch any space outside of it is securely calked with clay. It is a convenient form of movable gauge, which may be modified to accord with any of the various accepted definitions of the miner's inch.

High Explosives in Guns.

For a number of years past experiments have been going on in the endeavor to fire dynamite from a gun with black powder as the propelling force. The matter has by many been deemed impossible. A new invention in this direction by Lieut. J. W. Graydon and J. G. de Styak, of this city, has been tried recently with reported success. General Howard, of the U. S. Army, who is in command of this division, became impressed with the assertion of Lieut. Graydon concerning the invention and ordered a board of officers to report to him the results of the experiments. He gave the use of a three-inch Parrott gun for the demonstration. The board consisted of Major Harkin, Lieut. Slaker and Lieut. Harris. The report will be sent to the War Department.

At 1 P. M., one day last week, the firing commenced and was continued until 3:30 P. M., and until the board were entirely satisfied of the safety in firing. Projectiles 20 pounds in weight, containing three and one-half pounds of dynamite, displaced about three tons of solid rock. The board will report favorably on the advisability of allowing Lieut. Graydon to use larger guns, so that some idea of the effect of firing large charges of dynamite may be given. During the trials recently a dozen shells were fired, and at a range long enough to allow the two reports to be distinctly segregated. A large quantity of rock was blasted out of a solid wall by the experiments, and on one occasion a fence which got in the way was torn up for several yards. The gun used was an old condemned piece, and permission will be asked of the authorities at Washington by General Howard for a better one for the next demonstration, which will be with ordnance of considerable caliber. It is desired to fire 90 pounds of dynamite from a 15-inch smooth-bore gun. This will be a severe test.

JOHN BUIOLI, a miner in the Mount Pleasant mine, was poisoned last week, strychnine having been put in his dinner bucket. Buioli had a contract to work the mine, and his refusal to employ some other parties is the supposed cause of the crime.

FIVE cents apiece is the bounty paid in Modoc county for rabbit scalps, and the little animals are being destroyed by the wholesale,

MECHANICAL PROGRESS.

A New Cupola for Iron-Founders.

German contemporaries notice a new form of cupola, introduced by Greiner & Erpf, and stated to have been successfully worked at several places. In the ordinary cupola a main source of waste of the heating power of the fuel is found in the fact that a large portion of the carbonic acid, formed by the combustion of the coke at the tuyeres, is reduced to carbonic oxide in passing through the incandescent coke above, and passes away in that form out at the top of the cupola. Greiner & Erpf, in their cupola, burn this carbonic oxide again to carbonic acid, in the higher portion of the cupola, in such a manner that the heat so produced is used in warming the charge in the cupola, and the gas passing away contains only carbonic acid and no carbonic oxide. The lower tuyeres, where the combustion of the coke takes place, are quite as usual and worked in the ordinary manner. Above these are three circles of smaller tuyeres, arranged spirally around the cupola. Each tuyere can be easily opened, regulated or closed by means of a stopper, and each one has a glass-covered peep-hole to observe the combustion in the cupola. Experience has shown that, when the cupola is at work, there is a point above the combustion zone of the coke at which, by blowing in air, the carbonic oxide will ignite and can be consumed without the coke in the charge being burnt. This point will vary with the nature of the coals, pressure of the blast at lower tuyeres, etc., but can easily be found by observation through the tuyeres of the upper circles at varying heights. Air is then blown in at the proper point, and at the tuyeres above this, the pressure being so regulated that observation through the peep-holes shows that a continuous and progressive combustion of the gas is taking place without the coke being ignited at any part. The working and regulation of this cupola are stated to give no difficulty, and to have yielded excellent results at several works. In a cupola of 80 centimeters diameter, erected at one establishment, a trial was made in which 100 tons of iron were worked at 12 different meltings. The coke used was 5.01 per cent on the iron charged, and this is stated to represent a saving of 33 per cent, as against work in the old cupola of the usual kind. At other places where the system has been introduced, the coke per cent on the iron is given as 4.14, 4, 5.732, 4.5, which figures would vary with the quality of coke used.

Testing Water-tight Compartments.

An English exchange says that, warned by the fate of the *Oregon*, the Russian Government has been inaugurating an exhaustive test of water-tight compartments, which it contemplates applying to all new vessels, and probably to older ones as well. The man-of-war selected was the corvette cruiser *Vilias*, which was finished last autumn, and is under sailing orders for the Pacific this month. Five weeks ago an intimation was conveyed to the dockyard authorities at Cronstadt that the water-tight compartments would be tested in succession, and orders were given to survey them afresh, and make good any defects that might be discovered. If the official report is to be believed, every effort was made to meet the wishes of the Admiralty, yet when the compartments were actually filled with water the fluid gushed through numerous apertures which had escaped the eye, and in some cases to an extent that would have been troublesome at sea after a serious accident. To secure perfection several of the compartments were filled two or three times, and it was only after a deal of door-adjusting and leak-stopping that the corvette was pronounced fit to proceed to sea. A final test was then applied in the presence of the higher Admiralty authorities, a number of the nine large water-tight compartments being filled at once without any leakage. Besides insuring the rectification of all defects in the water-tight compartments it is claimed in the report that the tests have proved of great service in training the crew; they have promoted confidence in the buoyancy of the vessel, and have led to several improvements of an important character. It has been suggested that in this year's naval maneuvers in the Baltic the tests should be continued by ordering so many of the water-tight compartments to be filled, in the event of a torpedo cutter approaching within hitting distance of a man-of-war; but the defects revealing themselves in the case of the *Vilias* have made the authorities apprehensive of ill-results, unless harbor tests are applied beforehand.

MANGANESE IN STEEL is second as an element only to carbon. It is the combining element which makes cast steel possible. It would be practically impossible to melt pig and scrap iron, or pig iron and ore, and pour it into an ingot which would roll, as without it there would be sufficient oxidation to disintegrate the parts, causing it to fly to pieces as soon as it was rolled or hammered. Manganese has a greater affinity—that is, tendency to combine, for oxygen than iron has; so, if manganese be added either at the beginning or when the steel is melted, it will combine with any oxygen present, leaving the steel solid and free from oxygen. It must be added in excess to be certain to thoroughly deoxidize the steel, hence all cast steel contains more or less manganese. The

free manganese which is left in the metal after its use as an oxidizing element has a hardening influence. It is found in percentages varying from a few hundredths to over one per cent. The former percentages are found in some crucible and open-hearth steel, while the latter are by no means uncommon, particularly in Bessemer steel. The manganese is added in the form of spiegeleisen or ferro-manganese, which are compounds of iron, manganese and carbon, with silicon and other elements containing manganese in percentages varying from 10 to over 80. Before the introduction of cast steel manganese played no important part in the composition of steel, as it appeared only in inappreciable quantities, except in a few cases where the pig iron puddled was made from a highly manganiferous ore.

A NOVEL FIRE BOX.—Mr. C. K. Villas, of Alstead, N. H., recently patented a reversible rotative fire-box, consisting of a spherical chamber or box provided with perforated covers. By rocking this fire-box to and fro by means of a crank, ashes and clinkers may be easily removed. The apertures in the covers may be so small that very little coal can escape with the ashes and the objectionable process of dumping is thus entirely avoided. In building a fire the box is nearly filled with coal, which is kindled at the top; the apparatus is then reversed, bringing the fire under the coal, and in the same way when the fire goes out with the box nearly full of coal the above operation may be repeated without special inconvenience. By whirling the box around rapidly the ashes may be completely removed and the fire extinguished when desired.

THE STEEL WIRE GUN.—The new experimental 9.2-inch steel wire gun has just been tried at the government proof huts, Woolwich arsenal, with satisfactory results. The War Department has issued orders for the construction of several more guns of the same description. The government pressure test for the gun was 65 tons to the square inch. This new weapon weighs 25 tons and is 33 feet long. The steel wire is coiled round the inner tube at the breech and nearly up to the trunnions, and consists of 78 layers. The wire is made in lengths of 2400 yards. It is flat, and is put on by a specially-designed machine at a pressure of about 40 tons to the square inch. The lengths are joined by being brazed and riveted together over a length of 15 inches. After the wire has been put on, a steel jacket is shrunk on over it.

GUN VS. ARMOR PLATE.—The latest victory in the long-drawn match between the gun and the armor plate has been scored in favor of armor. At Spezia a German chilled steel armor plate, five feet nine inches in thickness, weighing 100 tons, was fixed against the face of the cliff and hattered with chilled shot from the 100-ton gun. A thunderbolt weighing almost exactly a ton was hurled against the face of the plate by the explosion of 750 pounds of powder without producing more than a slight indentation and some trifling cracks. Three shots failed to make any serious impression on the plate, which has thus come off victor in the struggle. It would seem that no shot yet invented will go through six feet of chilled steel. —*Pall Mall Gazette*.

SOAP TO CLEAN STEEL.—A soap for cleaning surgical instruments, and other articles of polished steel which have become flecked with rust by exposure in showcases, is made by adding precipitated chalk to a strong solution of cyanide of potassium in water until a cream-like paste is obtained. Add to this white castile soap, in fine shavings, and rub the whole together in a mortar until thoroughly incorporated. The article to be cleaned should be first immersed, if possible, in a solution of one part of cyanide of potash in four parts of water, and kept there until the surface dirt and rust disappear. It should then be polished with the soap, made as above directed. Articles so treated look as "good as new."

GLASS HAND-WHEELS.—Glass hand-wheels for steam fittings have been recently brought into the market. These are solid disks of black or colored molded glass which has been toughened, and are formed with a square hole for the spindle, on which they are fastened by a nut. Compared with metal hand-wheels they recommended themselves by their cheapness and less conductivity of heat, so that they can be always handled without fear of burns. They are stated to be more durable and cleanly than wood wheels, but it seems doubtful whether they would stand such rough usage.

TESTING IRON AND STEEL.—The extent to which iron or steel should be strained while testing it when made up into a hoiler, a small girder, a bolt, etc., is still a matter for debate, although a sort of general agreement has been arrived at, that the test stress ought not to be less than one-third or more than one-half of the ultimate strength of the material.

PROPORTIONATE WEIGHT OF SHAFTS.—The weight of shafts or bars are to each other as the squares of their diameters. Thus, a two-inch shaft weighs four times as much as a one-inch shaft.

A NEW PIPE JOINT.—A Pittsburg man has invented a joint for cast-iron pipes which proves highly successful, and is expected to revolutionize the system heretofore in use.

SCIENTIFIC PROGRESS.

Influence of Electricity on Plant Roots.

It is a fact generally known to botanists that the roots of aquatic plants incline to one side or the other when an electric current is passed through the water in which they grow. Mr. Elfring was the first to observe this fact, as long ago as 1882. He found that the majority of the roots examined by him curved positively, that is, toward the anode; others, on the contrary, curved toward the cathode; and, finally, some exhibited an inclination whose direction it was difficult to determine. Mr. Elfring endeavored to explain this phenomenon by saying that the current, acting upon the protoplasm, produces a diminution in the turgidness of the cells, and consequently a retardation in the growth; and this retardation being different at various points of the root, there results a curvature of the latter.

A little later, Mr. Brunchorst thought that he had discovered that the curvature depended solely upon the intensity of the current—that is to say, that a current of feeble intensity produced a negative curvature, and one of strong intensity a positive one. More recently some researches on this subject have been made by Mr. Rischewi. According to the theory which he espouses, the curvatures are attributable to cataphoric action. This scientist bases his theory upon the well-known experiment of Dr. Du Bois Reymond, in which two cylinders of coagulated albumen, placed between the electrodes, show an inflation at the negative electrode, and a contraction at the positive. This phenomenon is due to the fact that the water in the cylinder moves, under the influence of the current, in the direction of the latter. Roots afford another example of such action. As the turgidness of the cells increases on the side next the cathode, this side elongates, and a positive curvature is produced. The negative curvature is explained by the diffusion of the external liquid in the porous roots, this occurring on the side next the anode, when a current of feeble intensity is made to pass.

THE EARLY OCEANS.—RED HOT AND HIGHLY DESTRUCTIVE VAPORS.—It has often been a mystery to the uninitiated how such a vast erosive action as evidently took place could have occurred in the very early period of the earth's existence as a partially solid body. The following remarks of Professor Proctor will explain this matter quite to the satisfaction of every intelligent reader: The professor recently remarked that the present denuding effects of air and water are absolutely as nothing compared with the action of the denuding forces which must have been in operation when the earth was young. The oxygen and nitrogen of the air are but a residuum of what was once there. But besides these gases, now in due proportion to support the earth's life, there were immense quantities of carbonic acid gas, of sulphurous acid, sulphureted hydrogen, chlorine, horacic acid, and other destructive gases, some ready to assume the liquid form and so to be still more destructive. But there must also have been immense quantities of water in the form of vapor. The pressure of that primeval atmosphere must have been so great that the waters of such oceans as then existed could have turned into steam only at a temperature so far above the boiling point at the present atmospheric pressure that the surface of the ocean must actually have glowed with inherent luster. The water vapor in the air must have been steam at high pressure and intensely hot. The rains falling then must have been torrents of hot water, impregnated with destructive acids, and falling on intensely heated rocks, ready for most rapid change by the powerful influences of such deluges and of the dense, complicated and destructive atmosphere through which they fell.

THE POLARITY OF TADPOLES.—The following is reported about an interesting experiment of the physiologist, Prof. L. Herman. In a flat bowl filled with water, in which a number of 14-days' old frog-larvæ were disposing themselves, were sunk along the narrow side, ready for an experiment, thick zinc wires connected with a battery of 20 little zinc carbon elements. When the current was made, the whole of the little animals fell into a wriggling motion, which soon ceased. But all the larvæ without exception had taken up one position, in which the head was turned to the anode and the tail to the cathode. The animals remained in this position till the current was again broken, when they again fell into the wriggling motion, but now less violently. Repeated experiments proved that the living animals showed a decided polarity, placing themselves along the stream lines of a current with their heads all in one direction, this direction being reversed when the current was reversed. An explanation of this interesting phenomenon has not hitherto been given.

SOURCE OF ELECTRICITY IN A RAPID CHANGE OF TEMPERATURE.—A correspondent of the *Boston Journal of Commerce* writes as follows in regard to the source of electricity: I have already described some of the various ways by which electricity is generated in factories. I propose to continue the same subject in this paper, for not until this is thoroughly understood can I hope to point out intelligently the different methods that may be employed for its

mitigation. A fan blowing a current of cold air into a hot room is a powerful exciter of electricity, or a fan blowing a hot current of air into a cold room produces equally powerful results. A metallic disk is just as good a generator as glass, provided it is insulated; thus, a circular saw mounted upon a well-seasoned wooden frame, sawing kiln-dried pine boards, will charge with electricity every belt and machine in a large shop, whereas, the same saw mounted upon an iron frame and standing upon an earthen floor accumulates not an atom because it is passed to the earth as fast as generated. I have tried this. A friend of mine, who is a telegraph operator, called my attention one hot summer day to the sparks emitted by the wires. I found these sparks were produced by cold blasts of air from the northwest that occasionally rushed through a long cut some miles north of the office. Thus it may be seen by close investigation that the source of all electrical disturbances is in a rapid change of temperature produced by force of some kind, it matters not which, animal, chemical or the natural forces. As heat produces or liberates heat, so electricity can be employed to generate electricity. And here let me state that heat is not electricity. I am prepared to prove this by a very simple little machine that I made a few years ago that accounts for every atom of heat liberated in the production of electricity. If you place iron ore and coal in a blast furnace, the iron will fuse and run out; but the iron is not the heat, nor is it the coal. No, the iron is iron *per se*. So electricity is electricity and nothing else.

MAGNETIC QUALITIES OF IRON.—It is well known what an influence the quality of the iron in the field magnets has upon the ultimate output in a dynamo, and a case in point is mentioned by Mr. Gishert Kapp, showing how impossible it is to foretell accurately the performance of a dynamo unless the quality of the iron be exactly the same in the manufactured machine as the sample submitted. In the case of two machines manufactured for him, there was a difference of electro-motive force of 20 per cent between the two, although the machines were of exactly the same dimensions and treated in the same manner. It was imagined that in the first machine the iron magnets had not been sufficiently annealed, in consequence of the shortness of time allowed for the work. A second pair of field magnets were ordered and an extra time allowed for the work, the consequence being that 20 per cent more electro-motive force was obtained.

MOVEMENT OF THE WASHINGTON MONUMENT.—At a meeting of the Washington Monument Society, Col. Casey made some very interesting statements to the members of certain observations of the habits of the monument, by which it appears that the great obelisk is a moving, if not a living, thing, and that it has a regular swaying motion when the sun is shining upon it. On every bright day the apex of the monument moves at least one inch westward in the morning when the sun's rays first fall upon it, and eastward again in the afternoon when the sun reaches the western side. The heat of the sun's rays have an expansive effect upon the masonry, and the plummet that is suspended in the interior of the monument registers this movement from day to day.

OCEAN MOUNTAINS.—A French geologist, M. de Lapparent, lately called the attention of the Paris Geological Society to the effect gravitation has in heaping up sea waters upon the land. The continents are thus all situated at the tops of hills of water; and in crossing the Atlantic the ship has first to go down hill, then to cross a valley, and finally to climb another hill. The calculation has been made that in mid-ocean the surface may be more than half a mile below the level it would have been had continents exerted no attraction.

THICKNESS OF CLOUDS.—Captain H. Toynbee, of the London Meteorological Society, has arrived at the conclusion that clouds of not less than 2000 feet in thickness are seldom accompanied by rain, and if they are it is very gentle, consisting of minute drops. With a thickness of between 2000 and 4000 feet the size of the drops is moderate. With increasing thickness comes increasing size of the drops, and at the same time the temperature becomes lower, until, when the thickness is greater than 6000 feet, hail is produced.

INVISIBLE SUN RAYS.—A recent writer on photography and chemical properties of light says: "The experiments of modern photographers have revealed to us extraordinary chemical properties in the sun's rays, while some of these rays are entirely destitute of this peculiar power. It has also been discovered that there are rays of light outside of the solar spectrum, and which are invisible to the human eye, just as there may be vibrations in the atmosphere too high or too low to produce an audible sound."

A NEW GUM SOLUTION consists of two grams of crystallized aluminum sulphate dissolved in 20 grams water added to 250 grams strong gum arabic solution—two grams in five grams of water. Ordinary solutions of gum arabic, however concentrated, fail in their adhesive power in many cases, such as the joining together of wood, glass, or porcelain; prepared, however, according to the above receipt, the solution meets all requirements.

ENGINEERING NOTES.

Eads' Ship Railway.

Eads' Ship Railway enterprises has received a very encouraging lift from the Senate committee of Congress. In its report, presented by Senator Congar, the committee says: "Many of the most distinguished engineers, naval constructors and shipbuilders of the world concur in the opinion that the project is in every way practicable and that the largest ships, with their cargoes, can be safely carried upon a properly constructed railway over moderate grades. From these opinions the conclusion is irresistible that the project is a practicable one. * * * From the surveys it is apparent that the route is entirely practicable for the construction of the proposed road; that there is no swamp land encountered upon the line, and that the harbors are of a character suitable to the wants of the commerce of the world. The committee is of opinion, from a careful study of statements deemed to be reliable, showing the extent of the commerce which would be likely to use a transit way across the isthmus, if constructed, that the net annual revenue of the road will be in excess of the amount guaranteed by Mexico and the United States. It is possible that for the first few years there may be some deficiency to be made up by the two Governments, but such deficiency would be likely to be small, and after the first few years the committee is of opinion that none would exist."

It is not at all probable that the aggregate amount (\$7,500,000) will have to be advanced by the Government. If the road is made an engineering success it will insure such an enormous saving in distance that commerce will certainly avail itself of it.

The committee estimates, assuming that the tonnage will amount to 4,000,000 tons and that the average charge for transporting it upon the railway will be \$2.50 a ton, that the gross revenue of the road will amount annually to \$10,000,000. One-half of this will constitute the net revenue, and if this amount is earned neither our Government nor that of Mexico will be required to pay anything under their guarantee.

The Germ of the Cantilever Bridge.

The germ of the cantilever bridge system is quite ancient, and has been in use for centuries by the natives of Japan, Siam and Tibet, and by the aborigines of Mexico on this continent. This germ, as found both in Tibet and Mexico, consists of trees and vines and is made with a primitive hand hatchet. The first tree on either bank is large and long and extends over a rude stone pier, one-third being on the water side. The other end is weighted by wicker baskets filled with stones and suspended in pits on the shore side. A smaller tree is bound to the first by means of wild grape and other vines and with pieces lashed to the sides of the joint, if need be. The cantilever is rendered stable by additional baskets and stones, until the two sections are united, and a cantilever bridge spans the wild mountain torrent for a foot passage for the natives and for a model for modern civilization.

The following description of a bridge of this kind of a somewhat more pretentious character, constructed by native engineers of Japan, a long time ago, is from *Van Nostrand's Magazine*: "At the sacred city in Nikko the other day, I was rather amused and interested at seeing a fine and very costly bridge of cantilever construction—abutments of hewn stone, shore piers, hewn granite, octagonal, monolithic mortised for stone girders; monolithic plate beam to receive wooden superstructure. The stringers are fastened into the abutments, balance over the stone beam, but do not reach, by considerable distance, the gap being fitted by the middle stringers let into the short stringers. The Niagara bridge is a mere amplification of this one, built before America was settled, as a religious duty, very expensive, of thick, red lacquered work, and, like a bridge of angels, its planks are never profaned by the feet of the laity. But it seems queer-like to come away here to find our new inventions old."

THE PANAMA CANAL ENTERPRISE seems to have withstood the somewhat unfavorable report of the government engineer, and De Lesseps will get the additional aid which he asks for. There has never been any doubt about the possibility of constructing the canal; but it is now generally looked upon as an enterprise which can never pay any reasonable interest on the investment. With the aid of Lesseps' name and popularity, the indications now are that the work will go on to completion. But the wastefulness and extravagance of the management may well be considered by the French authorities in connection with the new loan contemplated. If the Government is to authorize a lottery loan for \$125,000,000 more or less, it certainly owes to the French people some care that the money shall not be wantonly and wastefully spent without reaching its object.

THE SOUTH, according to the *Baltimore Manufacturers' Record*, is about to enter upon an era of railroad building. The present proposals embrace a road south from Roanoke, Va., one from Augusta to Chattanooga, one called Georgia Midland Road, one from Atlanta to the sea coast, and several others which are being worked up with good indications of success.

USEFUL INFORMATION.

Coal Oil Nuisances.

Housekeepers may avoid all the nuisances and discomforts arising from the use of coal oil by thoroughly understanding how to use that useful and indispensable article. A perusal of the following ought to afford sufficient instruction in the matter: Of all misunderstood things in daily life, the use of the kerosene lamp probably stands at the head. First, a lamp is bought and fitted for use, and then filled day after day, and after a longer or shorter period does not give as good light as it used to; then some complaints to the oil man or grocer about the quality of the oil, when a little reason or judgment used would remedy the fault and remove the cause of complaint. If persons using a lamp would remember that the lamp is a machine combining the furnace and pump, and endeavor to learn the principle of using oil, much trouble would be saved; for while no one expects to use a large machine without learning how to work it, any one can use a lamp.

The wick is the pump to bring the oil from the font to the blaze, and as there is always more or less dust and dirt in the oil, the wick soon becomes clogged up and cannot pump oil fast enough for a good light; so a complaint is made when a new wick would remove the cause. Then as we burn oil out the lightest part burns, leaving the heavy oil, and as the lamp is filled day by day the oil gets so heavy that the draft is not strong enough to pump it up, when the oil should all be turned out of the lamp and it refilled with fresh oil. And then the burner, after a time, gets gummed up, and the even flow of the oil is disturbed and causes a smoky, uneven light, which is very vexatious.

When the wick needs cutting some scrape it off, others cut it so uneven that it makes a pointy blaze. The burner is furnished with a great number of small holes to provide air, to the end that perfect combustion may take place, and not to collect dust and dirt until they are all clogged up, and smoky, bad-smelling light is the result. Now, if in using kerosene we fill the lamp up with white oil every day, and once a week empty back the oil which is in the lamp, and use a wick cut even and true every week or once in two weeks, and are sure to have the lamp burner clean, and a clear, nicely polished chimney used, we will find that the kerosene lamp is a great and cheap luxury.

CAMEO CUTTING.—When a cameo cutter is ready for work he draws on the white surface of the stone with a lead pencil the design which he intends to produce in the cameo. He then follows the outlines with a diamond and cuts away the white parts outside. If the stone is small, he cements it on the end of a stick; if large, he holds it in his hand, and proceeds to work upon it with fine drills. He sits at a table like a sewing machine table, and by a treadle works a small lathe situated at his right. At his left is a frame filled with drills made of steel wire and of all varieties and shapes. The ends of the drills are covered with diamond dust ground in olive oil. The dust is obtained by crushing uncut diamonds by blows of a hammer in a small steel mortar. The cutter has placed before him a picture or a small model of the subject to be made. Everything then depends upon the correctness of his eye and his artistic instincts. The work is inexpressibly slow, but when completed it is marvelously perfect.

AN IMPROVED SEWING MACHINE.—There has just been patented a new sewing machine on the rotary shuttle principle, which the inventor, Mr. Waterston, Edinburgh, claims to be the simplest yet made for effecting the lock-stitch. The novelty of it lies in a circular saucer-shaped shuttle, which is set up on edge and laid with its flat side against the left-hand end of the lower shaft, while it is held in position by a revolving cup. The axis of the shaft, the shuttle and the cup, being in line and revolving together, the result is an easy motion far surpassing the old reciprocating shuttle. The machine may be said to be constructed on the rotary system, for nearly every part rotates, which renders, it is said, the motions easy and light and makes it capable of a much higher speed than any lock-stitch machine hitherto in use.

BONNETS MADE OF PAPER.—The craze for utilizing tissue paper in making artificial flowers and other ornaments, which has become so popular with society belles, promises to prove a boon to the citizen of limited means whose wife and daughter have an eye for the beautiful. A prominent society lady has hit upon the novel expedient of making ladies' bonnets of delicately tinted paper with the aid of a few more substantial materials for the purpose of securing strength and durability. Instead of a body of magnificent plush or velvet the framework of the bonnet is of tissue paper, costing about 15 cents, and the trimmings are of artificial flowers, with here and there a strip of ribbon. The effect is unique.

STEAM BICYCLES.—The latest thing in steam bicycles, according to the *Chicago Herald*, is the invention of a New Jersey man. The fluid used is gasoline, and is carried in a tank holding one pint, which is enough to run the engine an hour. The boiler is made of copper and brass, of the drop water tube type, with 14 half-inch tubes 10 inches long. It is a com-

plete boiler, with anti-burning jacket, safety-valve, steam and water gauges, etc. The water-tank is in the form of a globe, and is fitted with a little pump which feeds the boiler. The engine proper, including driving pulley, weighs scant two pounds. The whole outfit weighs only 18 pounds, and it is supposed to carry the rider along at the rate of 12 or 15 miles an hour.

A NEW FLOAT.—After considerable outlay in time and money Mr. A. J. Wright, of Cleveland, O., has succeeded in making a solderless copper float which is claimed to possess in a remarkable degree the essential qualities of buoyancy, strength and durability. These floats are said to stand with perfect ease a steam pressure of 200 pounds without either filling with water or collapsing; and how much more they will bear remains to be seen when facilities for still more rigorous tests are obtained.

DECLINE IN THE PRICE OF MAGNESIUM.—The cheaper method of producing magnesium has recently led to quite a decline in the price. The fall in England has been from \$3.75 to 65 cents. It is expected that the price in this country will fall to at least 75 cents instead of \$3 per ounce as formerly. This great reduction in price will soon lead to a more general use of this metal in the arts.

HOW TO KILL COCKROACHES.—Just before bedtime strew the floor of rooms which they infest with fresh green cucumber peelings, and as soon as it is dark they will come out to feast upon the savory morsels. You may count on poisoning one-half of all the first night. Two or three more feeds will relieve you of their presence entirely.

TO DEADEN SOUND.—In Germany they are now trying a composition of cork, sand and lime, molded into bricks, for the construction of light partition walls. It is said to exclude sound better than ordinary brickwork, while being light and a good non-conductor of heat.

CLEANING BRONZE.—Recent experiments have shown that treatment with potassium cyanide, followed by washing with an abundance of water, is the best means for removing the incrustations on bronze statues.

THERMOMETER TUBES have to be seasoned. This requires a year or two. When glass is new it changes, expands, contracts and warps almost as badly as green wood.

GOOD HEALTH.

A Small-Fruit Dissertation.

MESSRS. EDITORS:—If we paid our doctors as the Chinese do, so long as we enjoyed good health, and heat them, as they do, when we got sick, we should not be so distressingly dyspeptic. A similar course applied to school-teachers (pay for imparting true science, and stick for retailing nonsense or nonsense) might produce a rising generation wise as serpents and harmless as doves.

For instance, we profess to instruct our youngsters in all the ologies, and somehow neither we nor they regard the simplest rules of health. Take the modes and times of fruit-eating, for example. There's a wise old saw of our grandmothers as to apples being "gold in the morning, silver at noon and lead at night," which applies more or less to all fruits. And the modicum of comparative physiology any text-book gives enables us to see the rationale. We find that herbivorous and frugivorous animals are provided with a much more cumbersome and complicated digestive apparatus, and a much greater length of intestine, than creatures omnivorous. This for the obvious reason that their food is slower of assimilation. Now, a man goes to bed to rest and recuperate, not to keep his digestive organs hard at work to the annoyance of his nerves with a visitation of nightmare. Obviously, then, things difficult of digestion, such as fruits and vegetables, should be eaten in the early part of the day, and not at night.

It should also be remembered that all foods affect the digestive system in two ways—mechanically and chemically. Take, for example, the strawberry. It contains what is known as fragranic acid; producing a chemical effect on the accompanying food; while the numerous seeds affect the mucous membrane mechanically, and have the stimulating effect ascribed to the coarser parts of oatmeal and graham flour. This makes berries of all kinds specially valuable as articles of diet to many. Oranges or other fruits, of which only the soft pulp is swallowed, contain acids of various kinds (oranges, citric; apples, malic; peaches, prussic or hydro-cyanic, etc.), but lack the membrane-stimulus of the small seeds.

Often the benefit derivable from fruit is neutralized by a too free admixture of sugar, causing hilloiness, which is not infrequently attributed to the fruit.

In tropical countries the golden rule to avoid fever is to eat freely of fruit in the morning, but not a taste after midday.

EDWARD BEEWICK.

Carmel, June 6, 1886.

REMOVING OBJECTS FROM THE EYE.—We find the following in an exchange, and offer it for those who desire to try the experiment. Here

is one way of removing objects from the eyes: Take a horse-hair and double it, leaving a loop. If the object can be seen, lay the loop over it, close the eye, and the mote will come out as the hair is withdrawn. If the irritating object cannot be seen, raise the lid of the eye as high as possible and place the loop as far as you can, close the eye and roll the ball around a few times, draw out the hair, and the substance which caused the pain will be sure to come with it. The method is practiced by axe-makers and other workers in steel.

The Effect of Alcohol.

Dr. J. G. Jewell, superintendent of the Home for Inebriates, recently gave a lecture on the effects of alcohol on the human body, in the course of which he first mentioned some of the adulterations which are found in liquors, and which have serious intoxicating effects. Alcohol is the intoxicating ingredient in all spirituous liquors. It is a deadly poison to all plants and animals. The part of a leech dipped in alcohol becomes paralyzed forever. Alcohol injected into a frog with a small hypodermic needle will kill it in a minute. If half an ounce of it be injected into a dog, he will be dead before the needle is drawn out. Any man not accustomed to the use of liquor, who drinks six ounces of alcohol, will almost immediately die. Why, then, do hard drinkers live? asked the lecturer. The poison works slowly in them, he said. They die before their time. The liquor at bare is usually diluted with water. The drinker gets only about 25 per cent of the alcohol. Experiments have shown that there is an immediate congestion of the walls of the stomach when alcohol enters. Alcohol being an antiseptic prevents digestion. Hence every drunkard must become dyspeptic. Chronical colic produces inflammation of the stomach. The action of the stomach being suspended, the drunkard will not partake of food.

At the Home of the Inebriates the lecturer said he had seen drunkards vomit half of an ordinary bottleful of blood a day. Alcohol is a desiccator. It produces great dryness and thirst. Hence those who have imbibed it cool their thirst with beer, which influences the full flow of blood. Hence it is dangerous for drunkards to be wounded or cut. The drunkard, he said, is a hundred per cent more liable to accident, disease and death than the temperate person. Alcohol also hardens the brain, enlarges and changes the liver, and interferes with the proper action of the lungs.

INFLAMMATION IN EGGS.—There is a condition of the egg, little known, which considerably impairs its sanitary value as an article of food. Soon after it became the practice to transport eggs in large quantities and to long distances by railway trains, it was found on their arrival that adhesion had taken place between the membranes of the yolk and those of the shell, so that the yolk could not be turned out of the shell unbroken. On examination by experienced pathologists this was found to be the result of true inflammation; the material of the adhesion was found to be precisely the same as that of the plastic exudation in inflammation of the lungs or bowels. It will at first seem absurd to speak of inflammation in such an unformed mass as an egg, but this arises from our forgetting that, structureless and unorganized as it seems, the egg, even when fresh laid, is a living being, and capable of disease from external causes. The cause of this inflammation is undoubtedly the shaking and friction from the motion of the cars, and it cannot but render the egg more or less unhealthy, as the products of inflammation can never be as salutary in food as those of healthy growth.—*Bulletin of the Tennessee Board of Health.*

CLOTHING OF THE SKIN.—Dr. Startin, in a paper on the health of the skin, says: "A very prevalent habit exists of putting too many wraps upon the skin. No man's skin, or woman's, either, can be kept thoroughly clean and healthy by piling too much clothing upon his or her body. It is a fact that clothing in itself has no property of bestowing heat, but is chiefly useful in preventing the dispersion of the temperature of the body, and in some instances in defending it from the atmosphere. This power of preserving heat is due to the same principle—that of conduction and non-conduction—whatever form the raiment may assume; whether the natural covering of birds or animals, or whether the most healthful and elegant tissues of human manufacture."

ICE IN THE SICK-ROOM.—A correspondent of the *National Druggist* makes the following seasonable suggestion: "The writer's son suffered with typhoid fever during the heated term of last summer, when the temperature of the room often rose to 90° or 95°, and the patient's temperature ran up to 105° F. and over. A number of tubs were placed in the room, and kept filled with ice, and the doors kept closed. The temperature of the room sank to 80° or less, an average of 12° or 15° below the temperature of the other rooms in the house, and a cooler atmosphere not only added to the comfort of the patient but also aided in keeping down the body temperature and materially contributed to final recovery."

It soothes a feverish patient to bathe with warm water in which a little eucalyptus has been dissolved.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

LOYAL LEAD.—*Ledger*, June 19: There is scarcely a mine on the main belt having a more promising outlook to develop into a permanent-paying property than the Loyal Lead. It has been owned for the past four years by a company of 10 persons, all working miners and comparatively poor men. The ground owned by them includes the Pennsylvania, the adjoining claim on the south, both mines embracing 2080 feet along the mother lode. Under the present company work has been confined to the Loyal Lead claim. The development has been by means of two tunnels, the lower one, which is now being used, tapping the ledge about 80 feet from the surface. They have followed the ore body north and south, a distance of 115 feet, with ore at both ends. The ledge averages 15 feet in width, the whole of which is sent to the mill. A steady improvement in the grade of the quartz has been noticed as depth has been attained, with a large increase in the percentage of sulphurets. The rock is of a live character, a fair sample of which has been left at this office, showing several specks of free gold. A 10-stamp mill is kept running steadily. The stamps are light, however, not crushing more than an average of one ton per stamp per day. Some idea of the value of the claim may be gathered from the fact that during the past four years, working with very limited facilities, they have paid \$2,000 for the claim and erecting the mill, besides drawing \$3 per day per man as wages. For the past six months the rock has averaged \$6.15 per ton, exclusive of sulphurets. Some of the crushings have yielded over \$10 per ton. It is claimed by those best qualified to judge that there is ore enough above the tunnel level to run a 40-stamp mill for at least four years. The present owners are not able to put up the necessary machinery to develop the property on a scale which its present and prospective merits would justify.

MISCELLANEOUS.—Jason D. Wheeler has bonded the Doyle quartz mine, in Hunt's gulch, for the sum of \$15,000, to be paid on or before the first day of October next, the work of development to be commenced within 30 days from date of agreement. The Gover continues to look well. Eight more men were put to work last week, which fact alone speaks well for the prospects of the mine. The Lighthouse mine, near Butte City, has come to a standstill, with no prospect of work being resumed under Mr. Flagg's management. It is expected that the property will fall into the hands of Ginochio Bros. V. P. Yelmini is running 10 stamps of the Oneida mill on the old dump pile, which is said to yield a small profit over working expenses.

NOTES.—Amador *Sentinel*, June 19: We understand that the capacity of the Zeile reservoir is to be increased by raising the banks two feet. Mr. Wheeler, a well-known mining man, has bonded the Doyle mine, in Hunt's gulch, for \$15,000, with the intention of commencing work upon it. We trust this experiment will result in a more permanent investment than is usually the case when a bond is taken.

SUTTER CREEK.—*Ledger*, June 19: The 10-stamp mill purchased by the Iowa Company has all been hauled from Angels here. S. Breeze has got the job of putting it up. The old five-stamp mill has been taken down.

Calaveras.

KELTZ MINE SOLD.—*Calaveras Chronicle*, June 19: We are reliably informed that the Keltz mine near West Point has recently been sold to a San Francisco company for \$10,000. Mr. O. B. Peasley, one of the owners and the superintendent of the mine, informs us that a shaft has been sunk to a depth of 180 feet and crosscuts made, showing a well-developed body of ore very rich in sulphurets, and upon the very favorable developments made resulted the purchase of the mine.

El Dorado.

TUNNEL.—*Placerville Observer*, June 19: Superintendent Henry H. McClellan has got the lower tunnel at the Melton mine, Mountain township, in for a distance of 600 feet, and notwithstanding the rock is very hard, is pushing it at the rate of 25 feet per week. He will drive the tunnel something over 200 feet before starting up the mill again. They have rock enough in sight to-day to run the mill for a year, but Mr. McClellan says he is going to know just what there is to the Melton mine before he makes a new move. The Eagle King mine, under the superintendence of Jonathan Camp, is being vigorously worked, and the ore being taken out gives promise of a bright future for the property. The mine is located in Mountain Township, and arrangements have been made for crushing 100 tons of rock at the Mount Hope mill, the result of which crushing will probably settle the question of erecting a mill on the Eagle King.

Fresno.

FRESNO MINES THE BEST.—*Fresno Republican*, June 19: About the first of March last McDonald Bros. sold the Surprise mine near Grub gulch for the sum of \$60,000—a neat little fortune in itself. The purchasers were Tom Ewing and D. B. Gillett, who are now working the mine with increased facilities and making it pay handsomely. Shortly after this sale the Messrs. McDonald made an extended tour through the principal mining districts of Northern California, Idaho, Montana, Colorado and Wyoming, and from there they went to the Atlantic States, where they visited relatives and friends. Returning to California over the Southern route, they arrived at Fresno the 25th of last month. Their trip through the northwest was made with a view to finding a new location for mining, but after a thorough investigation they came to the conclusion, all things considered, that Fresno county is a better field for a legitimate mining business than any other section of the country. With this fact definitely fixed in their minds they are again actively at work. They have, since their return, in company with Mr. E. W. Chapman, commenced the reopening of the old Nat Harbert mine and are also at work upon a new location in Fine Gold, known as the Lewis mine. It is expected that both mines will be pro-

ducing by the first of January next. The success of McDonald Bros. in quartz mining in this county is one of many cases which attest the increasing richness of Fresno mines. We believe there is not a mine in the county which has been worked to a depth at which good returns may be expected which is not now paying property, and some of them are paying more on the capital invested than any other business enterprise in the country.

Humboldt.

ALONG THE KLAMATH.—*Humboldt Standard*, June 16: On Saturday last we had an interesting talk with T. W. Reece, mining engineer and deputy U. S. mineral surveyor, who has been operating a gravel mining claim during the past year at Big Bar on the Klamath. From him we gather the following facts relative to gold mining along the river: J. A. Perch has had from eight to twelve men at work since last November. His claim has paid well. Mr. Markham, just above Orleans, has had a profitable season. Henry Wilder has done well on his claim. The McBrown claim has been operated during the past season under the direction of W. H. Hamilton, from San Francisco. It is rumored that Mr. Hamilton represents a San Francisco syndicate and is now testing this claim in their interest, and should it prove satisfactory ample capital will be provided to work this claim to the full extent of its capabilities, having at hand every modern facility to extract and save the gold. So far it is believed the result of Mr. Hamilton's investigations have exceeded his most sanguine expectations. Mr. Reece has just completed a survey for a ditch for this claim which will bring in 2500 inches of water. The construction of this ditch will be commenced as soon as a favorable report is handed in by Mr. Hamilton. Fred Wilder's claim, next to the McBrown, has been operated under a lease by other parties and has doubtless proved profitable to them. The Red Cap claim has been operated by Lord & Allen. This bar, at the mouth of Red Cap creek, has paid well notwithstanding the many setbacks which have occurred. Lord & Allen have also operated the old Bristol claim, this season. The yield at this latter claim has been very remunerative, astonishing all, even those who were the most sanguine as to its merits. Big Bar, which in years past has been celebrated for its good yield, has been worked this season, but has not been remunerative. Saint's Rest claim, owned by Mr. Falk, of Arcata, but under lease to William Lord, has been operated and it is believed has paid well. At Witchepek, Frank Brown and Wm. Lord have been working all season and it is believed have made money. Below Martin's Ferry Captain W. J. Young has been working his mining ground, but with what results our informant has not been able to state. The Peckwan has been operated by William Lord and it is generally thought that the claim has paid. The past season has been the most favorable for mining operation on the Klamath that the mines have had for several years past. They have had plenty of water. The season began by the first of November and the water will be available on most claims until the middle of July. From the above facts it will be readily seen that gold mining is quite an industry in Humboldt county, and as population increases it will beyond question be extended. There is much ground along the Klamath and Trinity rivers and their tributaries, yet untouched, which would pay good wages if judiciously worked. Perhaps no great fortunes would be made, but men could live and earn a fair compensation besides. It is only one of the many industries awaiting the help of willing and active hands to be turned to profitable account.

Nevada.

NOTES.—*Grass Valley Union*, June 19: The Crown Point mine continues to produce good pay ore upon which the mill is running regularly. The Slate Ledge mine is also producing good ore which is being crushed at Perrin's mill. A ledge of good quality is showing in the tunnel of the Perrin mine. The shaft of the Boston mine is down 90 feet below the 230 level. The rock coming out of the shaft shows well in free gold. Drifts for a new level will be turned in a few weeks. The 230 level shows well as usual. No trouble is experienced now in banding the water. The Prescott Hill mine is yielding good pay rock all the time, which is crushed at the Orleans mill. The new mill of the Empire Company is gradually approaching completion. It will be the finest structure of the kind in the district. It will be run by water power under pressure.

Placer.

LOVE JACK MINE.—*El Dorado Republican*, May 18: We received a call last week from D. C. Lewis, one of the directors of a company which was incorporated on the 15th of last month for the purpose of developing this mine. The "Love Jack" is situated about four miles south of Greenwood, on the road to Garden Valley, and is on the same lode as the Esperanza, Belle and Rosencrans. Two shafts are sunk on the ledge, one of 40 feet and the other of 20 feet in depth. These show that the ledge is over 23 feet wide, and it is believed that the rock will average over \$6.00 to the ton. Owing to the great size of the ledge and the abundance of wood and water, the expense of extracting and milling the ore will be very low. The superintendent, N. D. Burlingham, is arranging for the erection of a 10-stamp mill, which will soon be set to work on ore already extracted.

THE CHINESE MINERS.—*Placer Republican*, June 12: A friend writes from Gold Run that that town is holding its own with most other mining towns. He regrets, however, to see so many mines falling into the hands of Chinamen. The Indiana Hill Mill and Mining Company's claim was sold to Chinamen recently, and they have employed Mr. W. K. White, an experienced miner and old resident of that locality, to superintend it for them. They are going to put this mine in first-class order and work it for all it is worth. We agree with our correspondent that it is bad to see the mines going into the hands of Chinamen. It would be far better that they should be idle for the present than that their treasure should be extracted by Chinamen and lost from our country and people forever. The mine the Chinamen works to-day, if let alone, would afford remunerative revenue some day for our own people. But the owner says, to put it in the shape of a bull, that he can't wait for a living until after he is dead, and as he is stopped from working his mine himself, he becomes desperate, and sells to the highest bidder, and the Chinaman can afford to offer the most because he can evade injunctions the best.

Plumas.

EAST BRANCH.—*Cor. Plumas National*, June 19: I will endeavor to give you a few items from the East Branch and North Fork of Feather river. Ted and Gene Whiting are hard at work and report fine prospects in the famous French Ravine quartz mine. Good luck to the boys. Tom Johnson is running a tunnel on Mill creek, and expects to strike it rich in the near future. Charles Fitch is ground sluicing in French Ravine, with a favorable outlook. S. L. Scott and S. Richwine are working on Rich Bar. They have some good paying ground and look bappy. Frank Evrand and Ligier, of Indian hill, had a splendid run this season, and their mine always pays well, but since they have been forced to stop pipping they look as though they were ready to swallow the whole of Sutter county. Keep & Co. are hard at work on Indian Bar, bottoming up their ground, and expect a good clean-up this fall. Mori & Lott's mine is lying idle for a short time. Black & Gamble, of Long Bar, are working ground that pays \$4 or \$5 to the pick.

San Bernardino.

MINNETONKA DISTRICT.—*Calico Print*, June 20: This mining district is situated about 30 miles south of Cadiz, on the A. & P. Railroad, and the mines about 15 miles from Twenty-nine Palms. The Virginia Dale Mining Company have several gold mines there from which they have taken out considerable ore, sufficient to induce them to erect a cannon-ball mill, which while in operation reduced the ore satisfactorily, but is deficient in capacity, not milling more than four tons of rock, under favorable circumstances, in 24 hours. The company, after a thorough test, found that they could not profitably reduce the ore with such a mill, and consequently recently suspended operations in the mine and mill until they can put up a stamp mill. It appears that other parties are trying to purchase the property, and the present company may sell their interest in the mines of which they are part owners. These mines are among the finest gold properties in the country. An abundance of water has been obtained in the company's well. When the proper reduction works are erected and the necessary capital expended in developing the mines the output of bullion from the same will undoubtedly be prolific.

About six miles from the company's mill is a group of silver-bearing mines owned by about a dozen parties. Among the fortunate owners of several claims are the Karns Bros., proprietors of the St. Charles hotel, of San Bernardino. We saw some good looking ore from their claims, containing brittle silver. The ore from these mines contains some gold and galena, but principally silver. According to samples made the ore averages about \$75 per ton. The ledge is large and well defined and extends through the group. A shaft has been sunk 50 feet, where the quality and quantity of ore is sufficient to warrant further developments. The boys are sinking as fast as possible, and are very much encouraged over the prospects before them.

Shasta.

DOG CREEK.—*Shasta Democrat*, June 16: I take pleasure in writing you a few lines in regard to the mines on the south fork of Dog creek. There have been several good strikes made here in quartz in the last few weeks. Messrs. Carter & Coyle have one of the finest prospects that I have seen in Shasta county. This mine is located on the headwaters of the south fork of Dog creek. It is a contact vein, the foot-walls being of porphyry, the hanging wall slate. The vein is on an average of three feet in width; it is ribbed quartz and carries some galena. The rock will mill \$20 in free gold; besides, the sulphurets are very rich. This ledge has every indication of going down to a great depth and carrying gold. There is a belt of country running from the head of South Fork to Clear creek, where there will be some more good ledges found.

IGO.—The machinery of the Chico mill is on the ground, and is being put in place. It consists of an eight-stamp Redstone Patent mill, with rock-breaker, and two Duncan concentrators, to be run by a six-foot Pelton wheel. The tunnel on the Dayton is progressing as fast as the nature of the ground will permit. The ore body has not yet been reached. E. L. Ballou's arastra is running on Hope ore, and more are being taken from the Manzanita. Hubbard & H. Shirlan are taking out ore from the Pacific, and running the same through the Meek arastra. J. P. Wright is running his arastra and taking out ore from his mines. F. Shirlan & Russell are running the Chicago mill on South Chicago ore. J. & E. Blank are taking out a run of ore from the North Manzanita.

WHISKY TOWN.—*Cor. Shasta Courier*, June 12: Now that the summer time is advancing and prospects look favorable for the future, I will endeavor to give you the latest from our little burg. Bradbury & Co., of Red Bluff, are developing some fine-looking mining property on Mad Ox. Their location lies directly north of the Mad Ox mine, and is surely a credit to that vicinity. The company have several men employed at the present time, and are taking out ore as fast as circumstances will permit. Their ledge averages from 18 to 24 inches in width, and is all classed as high-grade ore. Jackson Ferguson is taking out some good ore from his mine on Whisky Creek. He is contemplating the erection of a stamp mill on his mine this summer. A. W. Hawckett & Co. are drifting for gravel mines in Mad Mule Gulch, but have not completed the drift to where they expect to find their pay gravel. Kernel Mead and Robert Warfield are running a tunnel on the old Phoenix mine. They are in hopes of finding paying ore in the southern part of that location.

Sierra.

PURCHASED.—*Mt. Messenger*, June 19: The American Hill quartz property has been purchased by the Pilgrim Co., the purchase price, \$16,000, having been paid to Judge Van Clief a short time ago. Stephen Moore, the new superintendent of the Young America mine, has had long experience, having been superintendent of some of the best mines on the coast.

Trinity.

DEADWOOD.—*Cor. Shasta Courier*, June 19: Mr. McKibbins, a mining man well known in Colorado and Montana, has been prospecting around here for the last month or two, and after making some assays he bonded the North Fork mine, between the Monte Cristo and Eagle mines—the latter owned by John Harries and Mat. Chadbourne—for two thousand dollars. He has taken in two partners, T. Slattery and J. Reynolds. They have commenced extracting

ore and made arrangements with the Dreadnaught Company for its reduction when their mill is completed, which they expect will be about the middle of next month. Frick & Davis are running out excellent ore, and have about 75 tons on the dump ready for milling. Work in the Brown Bear mine is going on as usual, but the clatter of the stamps is not heard although the millmen have all they can do to renovate and thoroughly overhaul everything preparatory to a fresh start after the 110th anniversary of our independence. The new boiler is in its place and the cylinder has been sent to Marysville to be bored; also the shaft to be straightened. To expedite matters Superintendent Martin left for that city last Saturday, and will not leave until everything is shipped for the return trip. Time means money in this case. Two more concentrators are to be added, and the 15 stamps will soon be music in our ears. The Little Gem mine, belonging to Gibson & Leavitt, is still turning out rich rock, and keep their cannon ball mill moving. Balleau & Co. have 16 men at work chopping wood and moving their mill. They mean business when they start.

MORE QUARTZ.—*Trinity Journal*, May 19: Jas. M. Moore was in town from East Fork this week. From him we learn that John Day and himself are building an arastra to work ore from the Engle mine on Rich gulch, and that prospects are most flattering. James Daly, in connection with Moore & Day, has found a mammoth ledge on the east fork of East Fork, about 20 miles above the mouth of the latter, which promises well. It is six feet between walls and carries free gold, galena and galena sulphurets.

NEARING THE END.—Miners in Weaver basin are preparing for the final cleanup for the season, as water for hydraulic mining cannot last but a few weeks longer. The season's run has been an excellent one, as results will show.

BIG PAY.—The Venicia mine of Eastman gulch, owned by Mr. C. L. Blakemore, is maintaining its well-established reputation for richness and extent. A cleanup last week from 53 tons of rock produced 357 ounces of gold, or at the rate of over \$100 per ton. And there is said to be plenty of just as good ore in sight.

NEVADA.

Washoe District.

CHOLLAR.—*Enterprise*, June 19: The desired depth of 50 feet for a sump having been attained below the 3200 level, further sinking was discontinued day before yesterday, the total depth of the shaft from top to bottom being 3250 feet—the deepest vertical mining shaft in the world. The bottom is well into the eastern portion of the main ore channel, the material being vein porphyry, clay and quartz, carrying a small amount of mineral with no increase of water. Yesterday morning opening the station for the 3200 level was commenced on the west side of the shaft. When this is completed a lateral drift north will be started to connect with the drift coming south from the Hale and Norcross deep winze, and subsequently a drift west will be started to crosscut and explore the vein at that point.

CROWN POINT AND BELCHER.—Last Saturday morning the fly-wheel of the main hoisting engine at the Crown Point shaft broke, causing a sudden suspension of work in both mines. About 50 miners have been employed extracting ore from the 1400 level of the Belcher, a single hoist engine being used at the shaft. The breakage of the main engine was caused by the gradual settling of the ground at that point from the workings of the Kentucky mine, near by, as well as in the Crown Point, throwing the engine out of line. It is being properly lined up and substantially reset, a broken pillar block replaced by a new one, the other damages repaired, and it is now thought that the full force of men—over 200—will be put to work again next week, extracting the usual amount of ore as before the accident.

ALTA.—Very little advancement has been made during the week in the north lateral drift on the 700 level by reason of the ground near the Lady Washington shaft being considerably broken and loose, requiring substantial timbering. This work is now completed, and connection with the shaft is expected to be made to-day, there being but 10 feet or less of intervening ground to be excavated. This connection will be of great benefit, giving a good and much needed circulation of air throughout the Alta, and when fully completed crosscuts west will be started to explore the good ore vein along which this lateral drift has been skirting.

HALE AND NORCROSS.—On the 3200 level the main lateral drift south to connect with the Combination shaft is now out about 125 feet, and has 140 feet to go in order to connect with the Combination shaft or station being opened for a drift north to meet it. On the 2900 level the diamond drill sent out from the face of the main north lateral drift toward the Savage shows sulphurets among the drillings, indicating some ore in that direction. After the drift has been sufficiently advanced crosscutting will be done from it, with good prospects of finding a paying ore body.

SAVAGE.—The main lateral drift south on the 600 level is in 270 feet from the Gould and Curry south line and continues in fine-looking vein material, principally quartz carrying streaks and bunches of good ore. The crosscut east has cut through several stringers of ore giving high assays, yet none of sufficient size to constitute a paying proposition. They seem to show best to the southward, and another crosscut may show up the main body to which they evidently belong.

CON. CALIFORNIA AND VIRGINIA.—Daily yield about 400 tons from the several ore-producing sections from the 1850 level up to the 1200. The average value of the ore milled is about \$10 per ton, as indicated by average assays from battery samples. Among the other explorations for ore at various points is a southwest drift recently started on the 1650 level to go after known deposits in that direction.

SIERRA NEVADA.—On the 520 level the north lateral drift from crosscut No. 2 has been extended 60 feet, making a total length of 138 feet. The excellent progress made in this drift is owing to the favorable nature of the ground, the material being soft vein porphyry, clay and quartz. A few men are kept employed extracting some pretty good gold ore from the croppings of the mine on Cedar Hill.

BEST AND BELCHER.—The water in the Osbiston shaft was lowered seven feet, leaving nine feet further

to go in order to reach the track floor of the 2319 or bottom level. About three feet of the upper portion of the station is exposed, and the lowering of the water must necessarily be slower hereafter, as there are about 4000 feet of submerged drifts now to be pumped out at this point.

GOULD AND CURRY.—The further advancement of the upraise incline above the 500 level has been suspended for the present, and crosscuts east and west started from it 50 feet above the 500 level. These are now in respectively 28 feet east and 38 feet west. Both are in very favorable vein material—vein porphyry and quartz, giving low assays.

YELLOW JACKET.—About 140 tons continues to be the daily yield. This ore is principally low grade, with occasional streaks and bunches of a better quality. The concentrators at the Brunswick mill operate very advantageously on most of this ore taken from below the 400 level.

POTOMAC.—The new diamond drill hole, started since last report, 75 feet further north from where the other drilling was done, has penetrated east a distance of 65 feet, 25 feet of which is solid quartz, carrying a small amount of mineral.

OPHIR.—Work in and through the shaft has been suspended in order to thoroughly overhaul the hoisting works and surface machinery and put everything in a complete state of repair throughout.

KENTUCK.—The old workings continue their daily output of 60 tons of low grade ore, the various stopes and breasts holding out well.

MONTE CRISTO.—The west drift on the 150 level from the new shaft is still advancing in hard material.

Columbus District.

MOUNT DIABLO.—The stope below the west drift, on the fifth level, looks well. The intermediate stopes between the fourth and fifth levels are looking well. We have two stopes between these levels that show over three feet of \$70 ore. The stope above the west drift on the fourth level shows 18 inches of \$60 ore. We are sinking on a small bunch of quartz near the No. 2 winze, between the third and fourth levels, that looks favorable for opening. We are getting a small amount of ore of fair grade above the west drift on the third level. The intermediate stope below the third level, east of the shaft, is yielding a small amount of high-grade ore. We have started to extend a crosscut from the intermediate, between the second and third levels, to prospect the ground below the east stope on the second level. This stope looks about the same as do the stopes above the second level. These stopes are now turning out considerable ore. Bullion shipment June 8th, \$7773.41.

Hawthorne District.

AT WORK.—Walker Lake Bulletin, June 15: Work will soon be resumed in the deep shaft of the Dictator. A crosscut will be started at a depth of 100 feet. A crosscut was started in the North Star shaft, at a depth of 42 feet. After running 20 feet the foot wall was encountered. The ledge of quartz is three feet wide. Another crosscut is to be started toward the hanging wall. The Hindley Co. will declare a dividend in a few days of seven dollars per foot. The bar of bullion shipped from the Lapanta last week was valued at about \$4000, from 54 tons of ore worked at Cat Creek mill.

Jackrabbit District.

ONANDAGO.—Pioche Record, June 15: The Onandago mine of Jackrabbit, we learn from Henry Welland, who was out there on Sunday last, is looking fine. The ore vein is now about 18 inches in width. Everything about this mine indicates a body of ore near at hand, and only depth will determine this fact. This property has not been worked altogether as it should have been. Later.—From Pat McDonough, a disinterested party, who returned from Jackrabbit on Thursday, we are informed that they struck a handsome body of ore in the mine the first of the week. The ore is between three and four feet in width and solid. On the sides of the ore the ground is loose and somewhat broken, being spar, lime and iron mixed. They are just on the top of it. As yet there have been no assays made of this ore. In character it is about the same as that taken out above. According to description, this mine is destined to become a valuable piece of mining property.

Morey District.

GOOD PROSPECTS.—Belmont Courier, June 14: There are several men prospecting the mining claims at Morey. Recent reports from there speak well of the prospects of that camp.

Northumberland District.

PROSPECTING.—Belmont Courier, June 14: Neil McLeod is prospecting in Northumberland. There are good mines in this district which are bound to come to the front in the near future.

Philadelphia District.

UNDEVELOPED.—Belmont Courier, June 9: Philadelphia district may be said to be still in an undeveloped state as far as its mines are concerned, and although hundreds of thousands of dollars have been spent in their working nothing is known of their value and extent below water. Grass root mining has absorbed the attention and the coin of the management and stockholders so far—with what profit is best known to themselves. Most of the mines of the district were rich and productive on top, and there is every reason to presume that they will continue so with depth. The veins carrying the silver go below water, but they are unprospected. Mining men of experience claim that the mines of East Belmont as soon as properly opened and worked below water will be among the most productive and remunerative in the State. It will take heavy machinery and capital to demonstrate this fact—and it is sure to prove a profitable investment. Most of the bullion of the Comstock came from below water, and there is more left to take out yet undiscovered.

Pioche District.

PLENTY OF MEN.—Pioche Record, June 14: Now that work on some of the mining property in Pioche is about to commence, we would not advise all the idle men in the country to come to Pioche for work, or they will be doomed to disappointment. There are a sufficient number of men here at present to do all work required. The toot of the Raymond & Ely whistle was heard on Thursday, the first time for a

great while. Engineer Stoddard has not forgotten how to play on the instrument. Fifty tons of manganese ore from what is supposed to be the croppings of the Raymond & Ely, in Pioche, has been chloridized in the B. S. Company's Stedefeldt furnace, the chlorination averaging 85 per cent. This ore, or croppings of ore, without assorting, averages 18 ounces in silver per ton. So far the lixiviation process has proved a failure on Bullionville tailings, and it is more than probable that they will be left to the chloridizing influences of the elements until scientific research has discovered in the laboratory of mineralogy something that will materialize their rebellious character. The future for Pioche looks much brighter than it has for a long while. A number of men, during the week, have been placed at work calking water tanks, and doing other work necessary for the resumption of active operation in the mines. What will be the name of the new company that is about formed, we did not learn, but are informed that most of the stock has been subscribed. Mr. L. D. Davis, an experienced and thorough miner, who in years gone by has worked in the principal mining camps of this State and California, has been appointed foreman of the company, and is doing all that lies in his power in having all works placed in readiness, but it will take considerable time yet before this will be accomplished. After completion of arrangements by the company, work will then be prosecuted with vigor.

Reveille District.

EXCELLENT INDICATIONS.—Belmont Courier, June 14: We learn from Ed. Cavanaugh that the work of prospecting the various claims at Reveille, Nye county, is progressing with energy. The Gila mine is looking well, and good quantities of rich ore have been extracted. The indications are excellent for uncovering big bodies of ore in this mine. The mill is receiving the finishing touches, and it is expected that it will start up on ore from the Gila mine on the 5th of July next. The Norris Brothers, Joe Bianchi and others are also working on their properties, and the chances for extracting rich ore from their claims are splendid. In fact, Mr. Cavanaugh is of the opinion that the mine-owners of that district will be rewarded for their labors before the end of next summer.

Trinity District.

MINES BONDED.—Silver State, June 16: Some 18 mining locations in what is known as Arabia, in Trinity mining district, have been conditionally sold by George Lovelock to James Duncan, of San Francisco.

Tybo District.

ENCOURAGING.—Cor. Belmont Courier, June 14: The prospects of Tybo making another boom are very encouraging. After persistent prospecting by the indefatigable prospector, W. D. Dimick, the westerly continuation of the once bullion-producing 2-G vein has been discovered and work of development commenced. A shaft down 10 feet shows a vein of ore 12 to 14 inches in width, increasing as depth is attained. The ore is precisely the same as that extracted from the 2-G vein in its palmist days, showing that it is the same belt. Assays run from \$50 to \$225 in silver, carrying in gold \$4.10 to the ton. The ledge can be traced along the surface for 400 feet, showing croppings of rich ore in several places along the vein, the course and pitch of the vein being the same as 2-G. This new discovery is known as the "Ma Alta" claim. On the east end of the 2-G vein comes the "Comet," located by Capt. George Turin. This claim is looking very encouraging. A tunnel 98 feet in length, the face of which is in porphyry, denotes a close proximity to the vein. This claim lies 300 feet, more or less, east of the famous Garrett Chamber, which produced \$1,000,000 at the time that the Tybo Consolidated Mining Company had the furnaces in full blast. The G. F. mine, owned by the Gilmore Brothers, is looking splendid. They are sinking a shaft on the vein and have a very good prospect. The ore is somewhat different from 2-G ore, carrying no lead; in fact, it is a fine milling ore; assays run from \$40 to \$260 per ton. They have from 20 to 30 tons of ore in sight. What is now needed to restore good times in Tybo, once more, is a strong company or syndicate that will take hold of the above-named properties, and cause bullion to be shipped as freely as in the early days.

ARIZONA.

NEW REDUCTION PROCESS.—Tombstone Democrat, June 19: John P. Clum, Richard Rule and Ed. Wilson are busily engaged in preparing works for the reduction of ores by the Rule-Wilson process, which is the result of much study and a long series of experiments on the part of the inventors. It has several points of superiority over any other known process. It is cheaper and works the ore closer, and is beside used with success upon the most rebellious ores. Messrs. Rule and Wilson are confident of ultimately realizing a fortune from the process, the only drawback at present being the necessity capital to put up a plant and start the works going. The Democrat trusts their brightest hopes may be realized.

COLORADO.

MORNING STAR.—Georgetown Courier, June 19: Forrest & Hogan, lessees on the Morning Star lode, Republican mountain, are drifting west from the bottom of the shaft on a vein of nearly solid ore four inches in thickness. The Golconda lode, near Dumont, has been leased to Mr. Tryner, who will commence work right away. We are acquainted with this property and know it to be a number one gold lode. A fair vein of ore has been opened up in the lower east level of the Maple Leaf lode, York district. A tunnel has been started to cut the St. Louis lode, on Capital mountain. The raise which has been under way on the Lyon lode, Fall river, has just been completed, and a contract to drive the drift ahead has been let. The breast shows a vein of solid ore eight inches in thickness. The standard tunnel, on Fall river, has been driven a distance of 85 feet this year. This tunnel has crossed several veins, three of which look very promising. A contract has been let to drive the east drift on No. 6 ahead. The breast of the latter shows a vein of solid copper pyrites, ranging from six to eight inches in thickness. The following Clear Creek mining companies have

paid dividends as follows for the first five months this year: Colorado Central, \$27,500; Friland, \$60,000; Plutus, \$20,000. The Rombauer hydraulic, at Empire, is now in working order and running like a charm under the able management of Amos Morse. W. M. Moore and Silas Hanchett, of Empire, Henry Lehman and Capt. Mills, of Middle Park, and Chas. W. Steele and Armstrong Shepherd, of Georgetown, have associated themselves together for the purpose of testing the so-called carbene fields near Grand Lake. They propose sinking a shaft 60 feet. Martin and Hannigan have resumed work on the Mauch Chunk lode, Columbian Mt., and are driving the drift ahead, which starts in near Beaver gulch. The breast shows a little mineral coming in on the foot wall. This vein produced some rich ore in early days.

IDAHO.

ORE.—Coeur d'Alene Record, June 14: Bob Horn and Chas. Ruddy have bonded the Central mine, on Boulder creek, one mile from Mullen City, and will begin taking out ore at once, and expect to be shipping to the Kentucky Smelting Works at Milo within six weeks. The Central is presumed to rank next to the Hunter in value. The ore is high-grade galena, assaying at the present point of development 40 ounces in silver and 60 per cent lead. The wisdom of the county commissioners in ordering the construction of the Mullen City and Two-Mile road is shown by the fact that in the working of this single property it will keep thousands of dollars within the county which otherwise would have gone out of the territory, as these gentlemen had intended to ship their ore via Thompson Falls to Helena. All the bedrock which was piped off on the Arizona claim has been cleaned and work suspended for the season. This claim has done well, and with a supply of water would make the owners rich in a single season. But like all the old channels it can only be worked a short time in the spring. Most of the money taken out this year has gone for expenses of flume and water pipes and getting the claim well started. From this time on but a small percentage of the value of the gold will be needed for expenses. It has fully met the anticipations of the owners, and adds another proof of the richness of the old channel. The Occident arrastra stopped two hours Tuesday and took out about \$1200 for current expenses, and will run for some time before making a thorough cleanup. We were hoping they would take out the entire produce of their 100-ton run, as several parties are anxious to make this test a basis for determining whether or not to put up similar works. Rich strikes are reported on the Fanny May and Iuka lodes on Elk creek. These properties are owned by Albert Allen, Martin Lewis, of Salt Lake, James Pannel, Maurice Leaby and Hank Otley.

MONTANA.

ANACONDA.—Cor. Butte Miner, June 19: The stamp mill of the Pyrenees Gold Mining Company is now in operation at their mine at Georgetown. Superintendent C. H. Moore arrived in town yesterday with a considerable shipment of bullion, which he took to Butte last evening. Caplice & McCune put a large force of men to work this morning to construct an immense dam for the Anaconda Company, about a mile west of this city.

NEW MEXICO.

SOCORRO.—Bullion, June 19: Robinson and Glasen have resumed work on their gold bonanza in the Oscuras. The Graphite smelter is in receipt this week of a consignment of ore from the Comstock mill of Kingston. On Tuesday last 13 cars of bullion, containing 182 tons in all, left the Socorro depot for the Eastern market. Capt. Day has struck \$60 ore in his Mugwump claim, situated in Water Canyon. He now proposes to increase his working force. George Cross, of the New Mexican, is developing a good-looking claim in the vicinity of Santa Fe. It possesses promising iron croppings. Dr. Shands, of Forney, Texas, and co-owner in the St. Vincent mine, left for his home this week. Work on this property is to be prosecuted with vigor. Wm. Dunn, of Hermosa, arrived at the Biling Works Wednesday with a wagon train loaded with ore from the Antelope mine of that camp. It samples \$400 per ton. Col. E. L. Mann will in a few days resume operations on his Bonanza extension of the Silver Glance, in the Polydoro district. This is one of the highest grade mines in the county. George Voorhies is the owner of a valuable group of claims in the San Acio district, on which he will inaugurate development speedily.

UTAH.

REVIEW.—Salt Lake Tribune, June 18: There has been no event of importance during the week. A cold wave with wind and rain swept over the country, but no frosts are reported in the valleys; snow fell in many places in the hills. The shipments of the metals out from this city for the week ending Saturday, June 12th, inclusive, were as follows: 35 cars bullion, 858,498 pounds; 33 cars ore, 737,218 pounds; five cars copper ore, 150,300 pounds; two cars sulphur, 51,000 pounds—74 cars, 1,797,016 pounds. While shipments of ore were considerable compared with the output for some time past, the ore treated at home continues large in amount and value. For the week ending June 16, inclusive, the amount of it received and held in this valley was \$85,380.47; amount of bullion received at the same time, \$116,813.82, a total of \$202,194.29. For the previous week the receipts were \$217,208.96, of which \$68,952.23 was in ore and \$148,256.73 in bullion. No ore was received from the Ontario during the week. The ore sales for the week were \$26,173.53. The mill started again on the 16th. Two hundred shares of Ontario stock were sold in New York on the 7th and 10th, at \$29@29.50. The Daly product for the week was seven bars of bullion, \$7799.82; ore sales, \$7320.53; total, \$15,120.35. The Horn Silver shipped 20 cars of high-grade ore last week, but no figures can be had of its value. The base bullion received during the week is valued at \$16,700; the fine bars at \$15,600. The Stormont sent up on the 14th, in fine silver, \$2774. The Hanauer smelter produced during the week \$30,030 in bullion, the Germania, twelve cars, \$23,112.13. The Alice sent down on the 14th sixteen bars of bullion, \$13,597.69.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING JUNE 15, 1886.

\$43,624.—CLEANING GRAIN—B. D. Crocker, Walla Walla, W. T.
\$43,891.—APPARATUS FOR CLEANING GRAIN.—B. D. Crocker, Walla Walla, W. T.
\$43,660.—REMEDY FOR DYSPEPSIA—B. Farley, S. F.
\$43,706.—CARTRIDGE LOADER—Geo. J. Foster, Alameda, Cal.
\$43,713.—SAW TOOTH—Simon Kinney, Brownsville, Cal.
\$43,717.—SPRING HARROW—L. A. Manchester, Merced, Cal.
\$43,595.—PRESERVING BEER—T. & D. Morris, S. F.
\$43,596.—SUPPLYING CARBONIC ACID TO BEER IN KEGS—T. & D. Morris, S. F.
\$35,697.—FRUIT DRIER—U. S. Plummer, San Jose, Cal.
\$43,734.—FEED MECHANISM FOR DRILLS—M. Schwarzer, S. F.
\$43,741.—BEER OR FLUID DRIPS—F. C. & H. A. Stober, Sacto, Cal.
\$43,781.—TRANSOM VENTILATOR—J. P. Tierney, Oakland, Cal.

Note.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Mining Share Market.

Mining stocks continue inactive, no developments of special note having occurred of late to enliven matters. The deeper sinking of the Combination shaft on the Comstock has been suspended, the present desired depth having been attained. The shaft is now 3250 feet deep. At the 3200 level a station was commenced yesterday, leaving the 50 feet of the shaft below that point for a sump or drainage well. This station is being opened on the west side of the shaft, and when it is fairly chambered out and completed a lateral drift north will be started from it to meet the drift coming south from the Hale & Norcross deep winze on the same level. It is a very significant circumstance that no increase of water was found in this 100 feet of deeper sinking, and especially at the bottom, where the shaft passed into the main channel. A new base of explorations is now reached and its development commenced. It will take at least a year to thoroughly explore this new level, and it being in new and interesting ground it certainly is to be hoped that the good ore developments found in the levels above it may concentrate into a paying bonanza somewhere at that depth.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Oro Grande mill, June 20, \$2000; Holberg & Co., 20, \$1000; Moulton, 14, \$18,400; Alice, 15, \$13,597; Hanauer, 15, \$9300; Stormont, 15, \$2774; Germania, 15, \$7179; Idahoan, 16, \$2200; Germania, 16, \$1800; Hanauer, 18, \$3100; Pascoe, 18, \$2100; Crescent 18, \$4500; Queen of the Hills, 19, \$1700; Hanauer, 19, \$1700; Alice, 20, \$14,011; Germania, 20, \$10,177; Hanauer, 20, \$9080; Pascoe, 20, \$1700; Crescent, 20, \$4350. For the week ending June 20, inclusive, there was shipped out from Salt Lake 34 cars of bullion, 812,394 pounds; 28 cars ore, 587,400 pounds; eight cars copper ore, 243,750 pounds; a total of 70 cars, 1,643,544 pounds. Wells, Fargo & Co., Salt Lake, shipped last week \$81,450; McCormick & Co., \$68,199; Jones & Co., \$38,947; Union National Bank, 20, \$13,597.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco:

GOLD VALLEY G. M. Co., June 22d. Location, California. Capital stock, \$1,000,000, in 100,000 shares. Directors, Guy Thorp, W. B. Helling, A. Judson, George K. True and W. R. Judson.
OWYHEE M. Co., June 22d. Location, Nevada. Capital stock, \$1,000,000. Directors, J. C. Eaton, E. Scott, J. W. Pew, A. L. Perkins and W. C. Price.

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The Labor Problem.

By far the most momentous question before the country at this time is that which involves the relations of labor to capital. It overtops all other questions. In almost every department of industry, and in all sections of the country, there are demonstrations of organized united strength and firmness of purpose designed to benefit the laborer. The movement made a forcible demonstration of its strength by precipitating its earliest efforts upon two of the strongest, most extensive and best organized classes of corporations in the country—an overhead railroad at St. Louis and a city elevated railroad in New York. Demonstrations of this class have sometimes been called "a war of labor against capital." But such is a misnomer so far as the real issue is concerned. It is true that a certain element of our population often takes advantage of labor troubles to introduce a foreign element into the controversy, the movers in which are made up of a set of vicious individuals who openly profess to make war against capital; but that element has no place in the present controversy and has been most emphatically repudiated. Its presence, wherever it appears, is an insult to honest labor. But it is true that

There are Differences of Opinion

Among workingmen, as to how far their demands should go. No reasonable, thinking worker will ask for anything more than a fair living return for his labor—such pay as will enable him to support his family in a manner worthy of an American workingman. The same fairness will accord a reasonable return for the investment of his employer. Every intelligent workingman recognizes the unwritten but infallible law, that by reason of difference in intelligence, shrewdness and industry there must, and always will be, an unequal distribution of property; but the same road for improvement is open to all alike. But, unfortunately, all are not thus considerate, and demands have been made in some quarters which were altogether unreasonable, and which have consequently utterly failed. Two notable instances of this kind are the strikes on the Missouri Pacific at St. Louis and on the Third Avenue in New York. The number of workingmen actively engaged in this movement throughout the country is comparatively small, not amounting to 10 per cent of the total of those engaged in the various trades represented, and that, too, leaving entirely out of the question those engaged in agriculture, a number larger than all the trades combined. The members of the confederated trade unions are in such a small minority that they can have no hope to succeed in any important measure, except they have the sympathy of the working people at large. With that advantage they will be able to carry out every reasonable measure which they may initiate. Hence, due care and deliberation should be given to their every act. There are

Evils of Unquestioned Existence

Which must be rectified, and by which the workingmen may be benefited in various ways without any serious detriment to employers. Let the real evils be eradicated, but let that be done in a way least calculated to work injury to the innocent. Many of the strikes which have been ordered have worked incalculable injury to other workmen not directly interested. Such strikes have clogged the wheels of commerce and seriously discouraged the great army of the innocent workers who have had nothing to do with the troubles complained of. The great majority of workers have had no sympathy with such movements, and they have ignominiously failed. A few more repetitions of similar mistakes will turn public sympathy entirely from agitators, and all their efforts will come to naught. By all means, the workingmen should

Beware of Mistakes.

Better suffer a little longer and secure the sympathy without which they cannot hope to succeed. We have too much confidence in the good judgment of the laboring classes in this country to believe that they will, upon due reflection, sacrifice their individual judgment and conscience to a few unscrupulous men, whose only aim is notoriety. Do not be led into false positions—into irremediable mistakes. Have due regard to the rights of others while considering those of your own. There is quite too

much vicious preaching of designing men prominent in labor societies in insisting that the average capitalist is a grasping, soulless person, disregarding of the rights and needs of his employees. There are indeed many instances of that kind, but as a rule the assertion cannot be sustained, and its constant reiteration is designed only to appeal to the baser passions, for the still baser purpose of individual notoriety or aggrandizement. Let all such brawlers be classed with the disowned anarchist, for it is from such that the anarchist ranks are recruited.

The Mistakes in Striking.

Men have an undoubted right to refuse work—strike if they will—but no body of strikers has any right to physically interfere with another who is willing and anxious to work and needs work. The moment this "right of liberty and the pursuit of happiness" is interfered with or the property and lives of his employers assailed and destroyed, that moment the striker has crossed the line which separates him from the sympathy of his orderly fellow-workmen and the public at large. He is then no better than the armed Ku Klux or destroying anarchist. The American people are patient and long-suffering, but they will not tamely submit to any very long continuance of such outrages. Moreover, when the day of trial comes no distinction will be made between such actual law-breakers and those who stand back and support them through secret or any other organizations.

Legitimate Striking and Boycotting.

There is such a thing as allowable and legitimate striking and boycotting. The line which limits their legal action is so plainly drawn that it must be apparent to every well-disposed, right-thinking person. Every man has a right to sell goods or his labor to any other man who is willing to buy or employ. He may "strike" if he chooses, and withhold his labor; that is merely the refusal of a bargain with which he is displeased. He may "boycott" if he chooses, which is merely a refusal to hold intercourse or dealings with his objectionable neighbor. He may concert to do either with others, and so far as he avoids forcible interference with the rights of others who think differently from him, and confines his efforts to argument and moral suasion, he remains under the protection of the law. But he has no right to forcibly prevent another from exercising the same rights of free agency of which he claims the privilege. The country will not tolerate outrage and violence, for that is anarchism. There are now something like 100 men under arrest for acts of violence as strikers or boycotters. If such acts are continued, they and all others who may follow in their footsteps may expect to suffer the most rigid penalties of the law. But if the present season of cessation of such violence should continue and bid fair to become permanent, the fullest amenities of the law will be held out, under the view that the recent infractions were inconsiderate and due to an unhealthy excitement, mainly brought about by anarchists and enemies of law and order. The lesson taught by recent events is that the law must be held supreme at all hazards, and the verdict will be indorsed by nineteen-twentieths of our entire population.

Three Methods With Labor.

It has been truly said that there are three methods with labor. The first is an old-time one, and now, as we hope, somewhat obsolete. It is to get as much as possible out of the workmen and give the least possible return.

The second is more humane and politic. It is to pay decent wages and submit all differences to arbitration.

The third and best is to lend a helping hand and give the workmen, in addition to the mere wages, some share or advantage from the profits of the business.

It seems to us that this last method of dealing with the workman is not only the fairest but the one best adapted to prevent strikes and riots.

We have neither time nor space to discuss these questions to-day, but hope to make further reference to them at some future time. For the present it will be sufficient to quote the language of another, who at a late public labor meeting in Chicago advised "intelligent discussion, correct information, wise counsel, general forbearance on all sides, honest, fair and just dealings between man and man, and a careful

recognition of the rights of all." Such suggestions would, of course, be lost on the unintelligent, hot-headed agitators of labor reform; but we believe they will be justly weighed and considered by the more temperate and thoughtful of the members of trades' unions all over the country.

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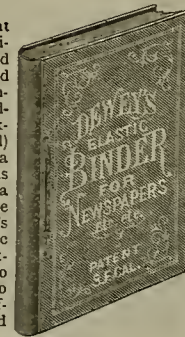
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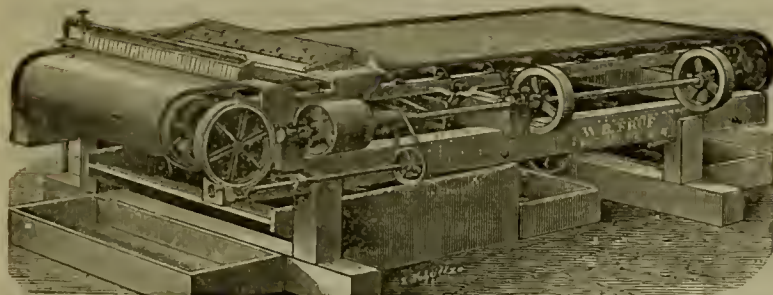
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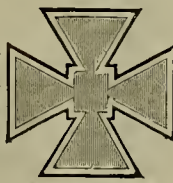
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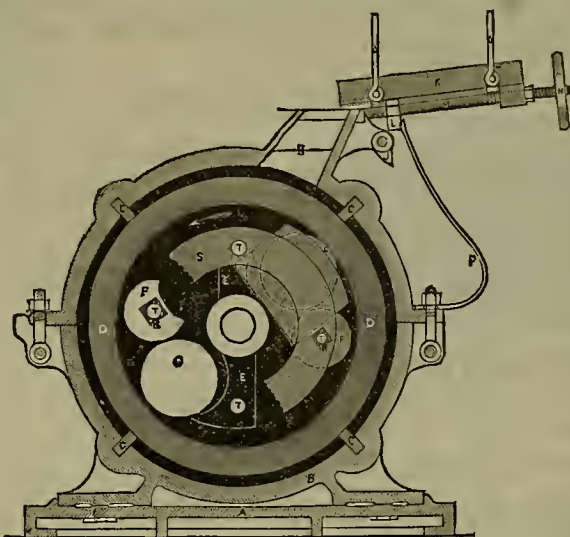
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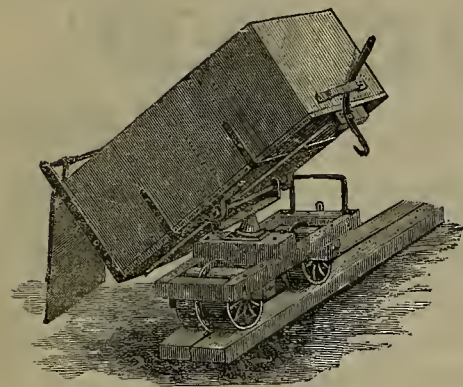
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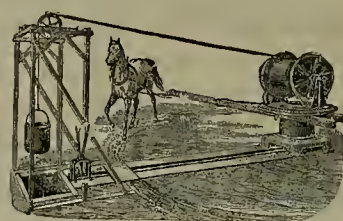
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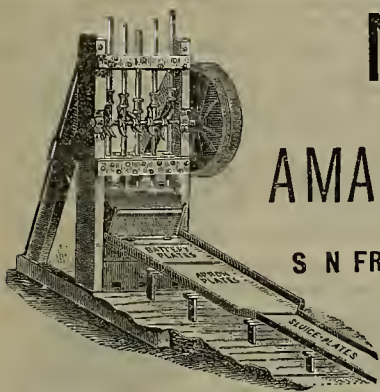
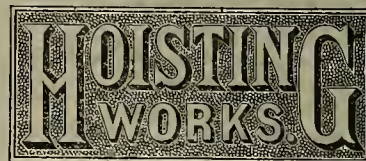
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Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

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STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

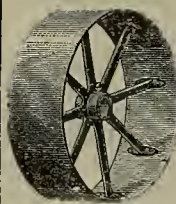
TRY OUR MAKE, CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

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PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

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THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL

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This Mill as a Crusher and Pulverizer is without rival. Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.**PUMPING****ENGINES**

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MACHINERY,**CORNISH****PUMPS.****FRASER & CHALMERS, MINING MACHINERY,****ENGINES AND BOILERS.****Huntington Centrifugal QUARTZ MILL.**

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Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:
Room 43, No. 2 Wall Street.

DENVER OFFICE:
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:
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JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

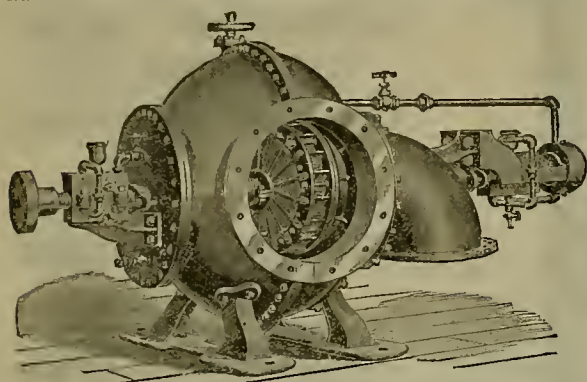
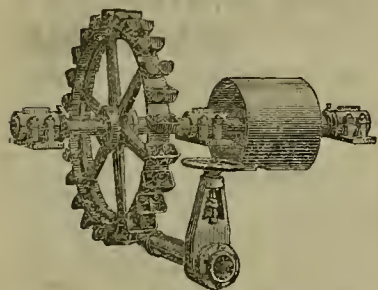
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,

Springfield, Ohio, Or 110 Liberty St., New York

FRASER & CHALMERS, General Agents,
Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal.

**PELTON'S WATER WHEEL.**

THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

THE HARTSFELD Portable Smelting Furnace Co. OF NEWPORT, KY., U. S. A.

Desires to send free full illustration and price list of their latest improved patents of Smelting and Mining Machinery adapted for the economical treatment of all low-grade ores in Europe and the U. S. of A. The Canada patent rights for sale on shares, royalty or otherwise. Address as above.



DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY is the oldest established and most successful on the Pacific Coast. No. 259 Market St. Elevator 12 Front St., S. F.

THE SCIENTIFIC PORTABLE FORGE

—AND—

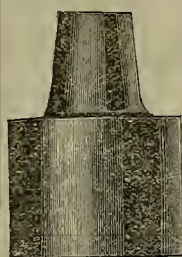
BLACKSMITH HAND BLOWERS.

GUARANTEED

The Lightest Running! The Strongest Blast! The Most Durable!

ADAPTED TO ALL KINDS OF WORK, AND MADE IN STYLES AND SIZES TO SUIT.

THE FOLS MANUFACTURING CO., - - Springfield, Ohio

**ADAMANTINE Shoes, Dies and Crusher Plates**

We manufacture the above Adamantine Shoes, Dies and Crusher Plates. They are in use on the hardest quartz in the United States and South and Central America, and have been

for the last ten years; we warrant them to out-wear three (3) sets made of any other metal, and many report that they last from 4 to 8 times longer than any other make. They never break AT THE SHANK, and the wear is so light that little or no foreign matter gets mixed with the crushed ore.

Also CHROME CAST STEEL for Mining and General Use, of the finest quality. For further particulars, address

CHROME STEEL WORKS,

H. D. ORRIS, Agent, 22 Fremont St., San Francisco, Cal.

When ordering, a rough sketch, with full dimensions, is all that is necessary.



ADAMANTINE.

CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

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No. 137 First Street, San Francisco, Cal.

IRON CASTINGS OF ALL DESCRIPTIONS.

Metallurgy and Ores.**SELBY SMELTING and LEAD CO.,**

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

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ASSAY OFFICE,

CHEMICAL

LABORATORY

Bullion Rooms and Ore Floors

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H. AUSTEL.

METALLURGICAL WORKS,
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Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters. Mines Examined and Reported on. Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

C. H. AARON,

ASSAYER AND METALLURGIST,

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

515 California Street,
Bet. Montgomery and Kearny, SAN FRANCISCO.

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - - San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scoriaires, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

Nevada Metallurgical Works.

NO. 28 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Andes S M Co.	Nevada.	29.	25.	May 28.	July 22.	B. Burris.	329 Montgomery St	
Belmont M Co.	Nevada.	40.	10.	Apr. 30.	June 5.	J. W. Pew.	310 Pine St	
Baker & Davis M Co.	California.	11.	25.	May 3.	June 7.	D. M. Kent.	330 Pine St	
Belle Isle M Co.	Nevada.	9.	10.	May 5.	June 9.	J. W. Pew.	310 Pine St	
Bodie Tunnel & M Co.	California.	13.	25.	May 28.	July 6.	C. C. Harvey.	309 California St	
Bodie Con M Co.	California.	5.	50.	June 21.	July 26.	Aug 16.	G. W. Sessions.	309 Montgomery St
Best & Belcher M Co.	Nevada.	34.	50.	June 14.	July 20.	Aug 9.	W. Willis.	309 Montgomery St
Crocker M Co.	Arizona.	3.	20.	May 25.	July 6.	July 28.	A. Waterman.	309 Montgomery St
Dudley M Co.	California.	12.	25.	June 21.	July 27.	Aug 16.	J. Stadfeld Jr.	419 California St
Eureka Con M Co.	Nevada.	9.	1.00.	Apr. 20.	May 31.	June 22.	E. H. Willson.	328 Montgomery St
Golden Fleece G M Co.	California.	5.	20.00.	May 23.	July 13.	Aug 2.	W. J. Glason.	Phe an Block
Gould & Curry S M Co.	Nevada.	53.	50.	June 21.	July 26.	Aug 17.	A. K. Durhrow.	309 Montgomery St
Hale & Norcross M Co.	Nevada.	90.	50.	May 12.	June 14.	July 7.	J. F. Lightner.	309 Montgomery St
Justice M Co.	Nevada.	44.	10.	May 12.	June 16.	July 6.	R. E. Kelly.	419 California St
Live Oak Drift G M Co.	California.	1.	25.	May 25.	June 30.	July 22.	T. Wetzel.	522 Montgomery St
Lucky Hill Con M Co.	Nevada.	3.	50.	Apr. 5.	June 7.	July 7.	F. D. Black.	27 Ellis St
Mexican M Co.	Nevada.	37.	25.	June 17.	July 22.	Aug 12.	C. E. Elliott.	309 Montgomery St
Mount Rose M Co.	Nevada.	4.	13.	May 13.	June 17.	July 8.	J. Oodington.	309 Montgomery St
North Peer M Co.	Arizona.	3.	02.	May 19.	June 24.	July 19.	H. Deas.	379 Montgomery St
Ophir S M Co.	Nevada.	51.	25.	June 7.	July 13.	Aug 2.	E. B. Holmes.	339 Montgomery St
Palmer M Co.	Arizona.	3.	50.	May 12.	June 22.	July 16.	A. Waterman.	309 Montgomery St
Palomas Placer M Co.	California.	1.	02.	June 1.	July 5.	July 19.	D. Buck.	379 Montgomery St
Sierra Nevada S M Co.	Nevada.	85.	25.	May 27.	July 1.	July 20.	E. L. Parker.	309 Montgomery St
Savage M Co.	Nevada.	65.	50.	June 17.	July 20.	Aug 9.	E. B. Holmes.	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Almont M Co.	Nevada.	T. Harman.	330 Pine St.	Annual.	June 26
Silver Lining M Co.	Nevada.	J. Stadfeld Jr.	419 California St.	Special.	July 8
Union Con M Co.	Nevada.	J. M. Huntington.	309 California St.	Annual.	July 19

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Caledonia M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Feb 23
Con Virginia & California M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	10.	Feb 19
Durham Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Feb 9
Holmes M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Mar 20
Mono M Co.	California.	G. W. Sessions.	359 Montgomery St.	25.	Mar 10
Manhattan S M Co.	Nevada.	John Crocker.	419 California St.	25.	Feb 17
Silver King M Co.	Arizona.	Nash.	328 Montgomery St.	25.	Mar 15
Young America M Co.	California.			40.	Apr 20

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, June 24, 1886.
ANTIMONY—French Star..... 9 1/2 @ —
BORAX—San Bernardino..... — @ 8
Armstrong..... — @ 6 1/2
IRON—(Hemphill)..... 22 50 @ —
Eglington, ton..... — @ 21 50
American Soft, ton..... 23 00 @ 24 00
Oregon Pig, ton..... 21 00 @ 23 00
Clippert Gap, Nos. 1 & 4..... 22 50 @ 23 50
Clay Lane White, ton..... 22 50 @ —
Shotts, No. 1..... 23 50 @ —
STEEL—English, D..... 16 @ 25
Black Diamond, ordinary sizes..... 10 @ —
Flow..... 4 @ —
Machinery..... 5 @ 6
Sanderson Bros..... 10 @ —
COPPER—
Braziers' sizes..... 19 @ —
Fire-hose sheets..... 20 @ —
Bolt..... 19 @ —
Sheathing..... 18 @ —
Ingot..... 12 @ 13
LEAD—Pig..... 4 75 @ 5 00
Bar..... 4 1/2 @ —
Pipe..... 7 @ —
Sheet..... 8 @ —
Shot, discount 10% on 500 hag Drop, 5 hag. 1 35 @ —
Buck, 5 hag..... 2 05 @ —
Orilled, do..... 2 25 @ —
ZINC—German..... 9 @ 10
Sheet, 7 1/2 ft, 7 to 10 lb, less the cask..... 7 1/2 @ —
QUICKSILVER—By the flask..... 35 01 @ 36 00
Flasks, new..... 1 05 @ —
Flasks, old..... 85 @ —
TIN PLATE—Coke..... 5 30 @ 5 50
Charcoal..... 6 15 @ 6 25

New York Metal Market.

Telegraphic advices dated June 24th give the following New York prices:

BORAX—6 1/4 @ 7 1/4 c.
BAR SILVER—98 per oz.
COPPER—LAKE—\$10.00 @ 10.12 1/2.
IRON—No. 1, \$17 @ 18.50; No. 2, \$15 @ 16.50.
LEAD—\$4.85 @ 4.95.
QUICKSILVER—43 @ 43 1/2 c @ lb.
The following is the latest by mail from the "New York Metal Exchange Market Report":
COPPER—Quiet, but fairly steady; Lake offered at 9.95c. Transferable Notices (Lake) offered at 10.05c. Transferable Notices (Chili Bars) offered at 10.15c.
LEAD—Steady at 4.80 @ 4.92 1/2 c. Transferable Notices (Domestic) issued at 4.90c.
SPELTER—Nominal at 4.40 @ 4.60c. Transferable Notices (Domestic) issued at 4.55c.
TIN—Lifeless. Transferable Notices issued at \$22.05c.
TIN PLATE—Dull. Transferable Notices issued at \$4.30.
IRON CERTIFICATES—Steady at \$15 1/4 @ \$17 1/4.
Transferable notices (June delivery) issued at \$16 1/2.
SILVER—New York, 98 per oz. London, 44 1/4 d.
MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00. Hudson River, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge \$15.00 @ 16.00. Southern, Grade No. 1, \$18.00 @ 18.50; No. 2, \$17 @ 17.50; Grey Forge \$15 @ 16.
Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$23.10 @ 23.20; Billiton Tin, \$23.10 @ 23.30; Banca Tin, \$23.15 @ 23.25; Baltimore Copper, \$9.75 @ 10.00; Orford Copper, \$9.75 @ 10.00; P. S. C. Copper, \$9.75 @ 10.10; Foreign Lead, \$4.95 @ 5.05; Foreign Spelter, \$4.75 @ 4.90.

Our Agents.

OUR READERS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
J. J. BARTLETT—San Joaquin Co.
G. W. INGALLS—Arizona.
E. L. RICHARDS—San Diego Co.
R. C. HUSTON—Idaho and Montana.
GEO. McDOWELL—Santa Clara and Santa Cruz Co's
J. B. PATCH—Nevada and Utah.
M. S. PRIME—Shasta Co.
FRANK W. SMITH—Oregon and Wash. Ter.
A. CALDERWOOD—Napa Co.

MINES WANTED.

Mines of every description wanted. State locality, means of access, character of ore, width of vein, amount of work done, wood and water facilities, etc. Silence of eight days a negative. Address Box 255 (B.), San Francisco.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING June 3.	WEEK ENDING June 10.	WEEK ENDING June 17.	WEEK ENDING June 24.
Alpha.....
Alta.....
Argenta.....
Belcher.....
Selding.....
Best & Belcher.....
Bullion.....
Bonanza King.....
Belle Isle.....
Bodie Con.....	1.35	1.60	1.35	1.45
Benton.....
Bodie Tunnel.....
Bulwer.....	1.25	1.90	1.55	1.70
California.....	1.40	1.45	1.35	1.40
Challenge.....
Champion.....
Chollar.....
Confidence.....
Con. Imperial.....
Con. Virginia.....	1.40	1.45	1.35	1.40
Con. Pacific.....
Crown Point.....
Day.....
Eureka Con.....	2.20	2.40	2.20	2.25
Eureka Tunnel.....
Exchequer.....
Grand Prize.....
Gould & Curry.....
Goodshaw.....
Hale & Norcross.....	2.25	3.50	2.50	2.60
Holmes.....
Independence.....
Julia.....
Justice.....
Martin White.....	2.50	2.65	2.00	2.55
Mono.....
Mexican.....
Mt. Diablo.....	2.30	3.10	3.10	..
Northern Belle.....
Navajo.....
North Belle Isle.....
Occidental.....
Ophir.....
Oreman.....
Potosi.....
Pinal Con.....
Savage.....
Seg. Belcher.....
Sierra Nevada.....
Silver Hill.....
Silver King.....
Scorpion.....
Syndicate.....
Union Con.....
Utah.....
Yellow Jacket.....

Sales at San Francisco Stock Exchange.

THURSDAY A. M., June 24.	50 Eureka Con.....	3.20
400 Alpha.....	550	10
325 Alpha.....	85 @ 95c	1300
105 B. & Belcher.....	1.00 @ 1.05	700
700 Bodie Con.....	1.45 @ 1.50	400
100 Bulwer.....	1.35	500
500 Benton.....	1.50	150
200 Belcher.....	1.25	200
450 Chollar.....	1.05 @ 1.10	1600
45 Con Va & Cal.....	1.30	100
50 Challenge.....	1.40	50
30 Confidence.....	3.00	100
120 Crown Point.....	1.10 @ 1.20	100
150 Con. Pacific.....	3.00	400
		Yellow Jacket..... 1.20 @ 1.25

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

To Young Men and Young Women.

All competent boys and girls should prepare themselves for usefulness in business if they wish to "step up higher." We have for sale to such, on easy and favor able terms, a scholarship in one of the best business colleges in the U. S. Address this office.

DIVIDEND NOTICE.

San Francisco Savings Union,
532 California Street, cor. of Wehl.

For the half year ending June 30, 1886, a dividend has been declared at the rate of four and one-half (4 1/2) per cent per annum on term deposits, and three and three-fourths (3 3/4) per cent per annum on ordinary deposits free from taxes, payable on and after July 1, 1886.

LOVELL WHITE, Cashier

JOHN A. ROEBLING'S SONS CO.
WIRE ROPE

GALVANIZED SHIP RIGGING, MINING, TILLER,
ELEVATOR, TINNED, & COPPER ROPE, SASH CORDS.
LARGEST WIRE ROPE WORKS IN THE WORLD.

IRON & STEEL WIRE OF EVERY KIND.

TELEGRAPH WIRE, HARD & SOFT COPPER WIRE,
INSULATED FOR ELECTRIC USE.
WIRES OF IRON & COPPER. FENCE WIRE,
SWEDISH IRON WIRE. CRUCIBLE STEEL WIRE.
TRENTON, N.J. & 14 DRUMM ST. SAN FRANCISCO, CAL.

L. C. MARSHUTZ.

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NATIONAL

IRON WORKS,

N. W. Cor. Main and Howard Sts.,
San Francisco,

...MANUFACTURERS OF...

Stationary and Compound
Engines,

FLOUR, SUGAR, SAW and QUARTZ
MILL MACHINERY.

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

...SOLE MANUFACTURERS OF...

KENDALL'S PATENT
QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that is claimed for it and give entire satisfaction.

MARSHUTZ & CANTRELL.

Send for Circulars and Price List.

CALIFORNIA

ARTIFICIAL STONE PAVING CO.

(SCHILLINGER'S PATENT.)

—FOR—

SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE
DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.

The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

OFFICE, 404 MONTGOMERY STREET, SAN FRANCISCO.

ROBERT JUDSON, President.

ALBERT H. REICHLING, Secretary.

G. GOODMAN, Manager

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Co.

ASSESSMENT No. 53.

Levied..... June 21, 1886
Amount..... Fifty Cents per Share
Due in office..... July 30, 1886
Sale Day..... Tuesday, August 17, 1886

ALFRED K. DURBROW, Secretary.
OFFICE—Room 69, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DEWEY & CO.'S SCIENTIFIC PRESS PATENT
AGENCY is the oldest estab-
lished and most successful on the Pacific Coast. No. 259
Market St. Elevator 12 Front St., S. F.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half year ending June 30, 1886, the Board of Directors of The German Savings and Loan Society has declared a dividend at the rate of four and thirty-two one-hundredths (4 32/100) per cent per annum on term deposits and three and sixty one-hundredths (3 60/100) per cent per annum on ordinary deposits, payable on and after the 1st day of July, 1886. By order.

GEO. LEITE, Secretary.

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LUBRICATION.

Our readers can procure of CHARLES J. WOODBURY Manufacturer of Oils, 123 California St., San Francisco, a fine Lard Engine Oil, unsurpassed by any other Oil for general use, and which will flow through any feeder at all temperatures. Also, Cylinder Oils, Refined Cylinder Tallow, Lubric Compound, Farm, Machine, and strictly pure Lard Oil. The Woodbury Oils are in use on the Central, Southern, and Northern Pacific Railways, and on nearly every Railroad and Steamship line on the coast.

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MADE BY THE
BEST AND CHEAPEST PRACTICAL METHODS
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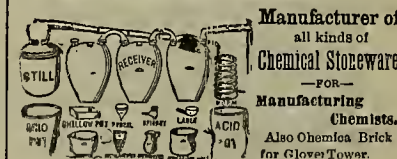
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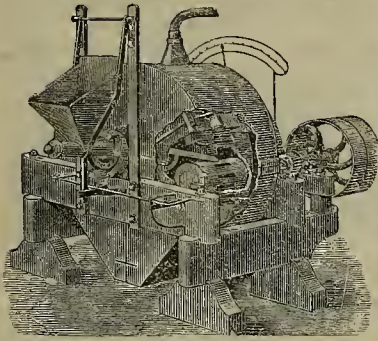
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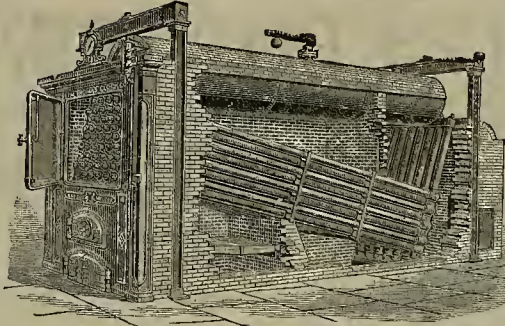
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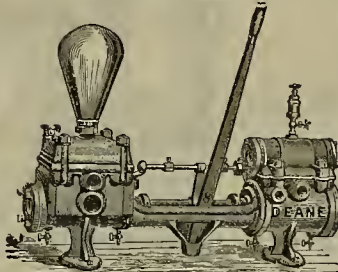
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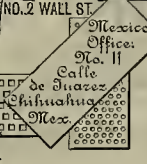
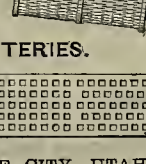
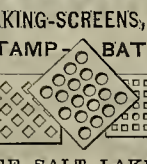
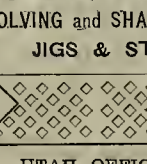
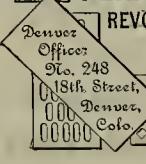
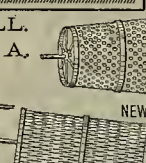
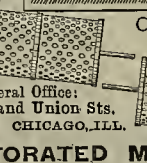
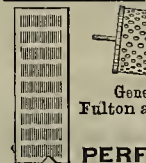
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
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
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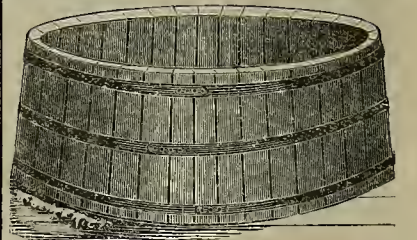
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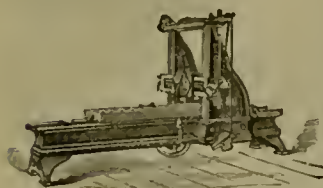
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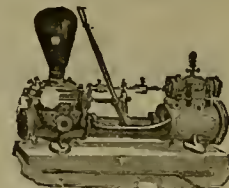


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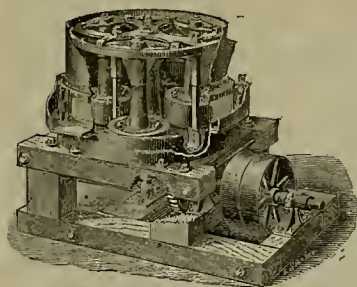
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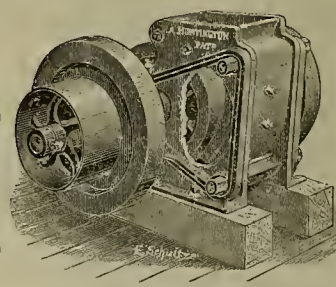
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